

# Amateur Radio

October 1996

Volume 64 No 10



*Journal of the Wireless Institute of Australia*



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information,  
articles and  
special interest  
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### PUBLICATIONS COMMITTEE

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#### CIRCULATION

Sue Allan

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#### TYPESETTING AND PRINTING

Industrial Printing and Publishing Pty Ltd,

122 Dover Street, Richmond, VIC 3121.

Telephone: 9428 2958

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6 Garden Boulevard, Dingley, VIC 3172.

#### AMATEUR RADIO CORRESPONDENCE

All contributions and correspondence

concerning the content of *Amateur Radio*

should be sent to:

#### Postal address:

Amateur Radio

PO Box 2175

Caulfield Junction VIC 3161

e-mail address: (column material only)

vk3br@c031.aone.net.au

#### REGISTERED OFFICE

3/105 Hawthorn Road

Caulfield North VIC 3161

Telephone: (03) 9528 5962

Fax: (03) 9523 8191

Business Hours: 9.30 am to 3 pm weekdays

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#### Cover

At the left is Chris VK6KCH, and on the right Dennis VK6LD, installing two new 20 kg solar panels at the 12 metre (40 ft) level on the 32 metre (100 ft) tower which supports the VK6RTH repeater antenna installation. For the full story, see the **Vertical** section of *Repeater Link* on page 48.

#### BACK ISSUES

Available, only until stocks are exhausted, at \$4.00 each (including postage within Australia) to members.

#### PHOTOSTAT OFFERS

When back issues are no longer available, photocopies of articles are available to members at \$2.50 each (plus \$2.00 for each additional issue in which the article appears).

The opinions expressed in this publication do not necessarily reflect the official view of the WIA, and the WIA cannot be held responsible for incorrect information published.

## Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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# Editor's Comment

## Questions, Answers and Changes

In last month's issue you may have noticed an advertisement on page 23 inviting quotes for the production and publishing of this magazine. No doubt you would like to know why Executive is proposing changes in this area.

The reason is in order to investigate whether *Amateur Radio* can be produced at less cost than by our current procedures, while retaining at least the same standard and format. It's your money, which possibly can be made to go a little further. It may be, nevertheless, that costs are already as low as possible, so cannot be further reduced. Change in this case would be pointless.

A change which has already been made is in our selection procedure for articles to be published in *Amateur Radio*. With a few exceptions, mostly involving topicality, we have up till now published technical articles, in particular, in the order in which they were received.

We have now decided that this is unfair to authors whose work is ready to publish while others need more editing, drafting or even re-writing, but still receive priority because they were received earlier. From now on, articles will be published in the order in which they become ready for publication.

Also, over the last few months there have been changes in the presentation of the propagation predictions, usually appearing on pages 52 and 53. This has involved a great deal of "behind the scenes" activity by Evan Jarman VK3ANI. We are happy to discover that not only have you, our readers, commented favourably on these changes, but that Evan has even received enquiries and congratulations from a couple of overseas experts for his improvements in presentation of the predictions.

Amateurs with Orders of Australia are continuing to appear. Eric Jamieson VK5LP was awarded an OAM in 1985. Good work Eric, sorry to be 11 years late!

**Bill Rice VK3ABP**  
Editor

## CONTRIBUTIONS TO AMATEUR RADIO

*Amateur Radio* is a forum for WIA members' amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of *Amateur Radio*. A photocopy is available on receipt of a stamped, self addressed envelope.



## ■ WIA News

Roger Harrison VK2ZRH, Federal Media Liaison Officer

# WIA Submission Calls For Amateur Service to Have its Own Licence System and a Licence-for-Life

The WIA has called for the creation of an Amateur Operator Licence separate from the current radiocommunications licensing systems, and the once-only issue of a licence-for-life to anyone meeting the requirements of an Amateur Operator's Certificate of Proficiency.

These requirements were called for in a WIA submission last month to the Department of Communications and the Arts (DOCA) in response to the *Radiocommunications Amendment Bill 1996*. The submission is published in this issue of *Amateur Radio*.

Additional submissions concerning other aspects of the Radiocommunications Amendment Bill and the Australian Communications Authority Bill were also sent to DOCA last month. The submissions were made in response to the release for public comment of Exposure Draft legislation proposing to amend the Radiocommunications Act 1992 and to create the *Australian Communications Authority* (ACA). The government gave a deadline for submissions of 5 September, one day short of three weeks from the day they were released, Friday, 16 August.

On learning of the news (see *WIA News*, page 3 in September's *Amateur Radio* magazine), the WIA proposed fast-tracking the Submission on Amateur Licensing, the exposure draft version of which was published as a supplement in the April issue of *Amateur Radio*. As the deadline for initial comment on this had expired on 30 June, work was already well under way on drafting a final version for consideration by the WIA

Federal Council at its October convention. The submission to DOCA was compiled by Roger Harrison VK2ZRH in cooperation with the WIA Federal Council and ITU Conference and Study Group Coordinator, David Wardlaw VK3ADW.

It was determined in Federal Council discussions that this submission should focus on the legislative issues, to create a fourth licensing system for amateur operators, and to leave the administrative matter of cost minimisation in relation to fees to a later submission to the Minister, but that this issue should be foreshadowed in the WIA's DOCA submission. In arguing for a fourth licence system specifically for amateurs, the WIA submission presented evidence of how the present three licensing systems are unsuited to the Amateur Radio Service in fundamental ways. Apparatus Licensing and Spectrum Licensing have clear commercial purposes, being based on economic concepts of scarcity and demand, and that the availability and use of spectrum to a licensee denies its availability and use by others, which the SMA terms "spectrum denial."

The price-based fees framework attached to Apparatus and Spectrum licensing, the WIA submission argues, reflects these economic concepts but has been severely distorted in the SMA's application of it to amateur licences. The WIA foreshadowed that the Amateur Radio Service in Australia would be better served by a licence fee regime that was truly transparent, equitable for all

## Additional Submissions

The WIA also submitted to the Department of Communications and the Arts additional comments on aspects of the government's proposed amendments to the Radiocommunications Act. These concerned the sale of spectrum licensing bands while still occupied, the repeal of Technical Licensing Specifications, EMC standards provisions, and health and safety provisions.

The WIA raised concern for the position and rights of radio amateurs where amateur frequency allocations may be affected by spectrum licensing, particularly where amateurs are the secondary service in an affected band. The WIA said that the Amateur Service in such cases is in a lesser position than incumbent primary users with whom the allocation is shared.

Technical Licensing Specifications (TLSs) are to be repealed, according to DOCA, because they are a redundant legal instrument, as licence conditions determinations serve the same purpose. The WIA expressed concern that replacing TLSs by determinations on licence conditions might not lead to better administrative flexibility and efficiency.

On the matter of EMC, the WIA expressed the view that current EMC provisions as applicable to the Amateur Service would continue. On the health and safety amendments proposed by the government, the WIA said that any determination made under these proposed provisions must be based on sound science and risk analysis.

Regarding the draft Bill to create an Australian Communications Authority, the WIA said it welcomed the move and would seek participation on any and all relevant advisory committees proposed in the draft Bill. The WIA advised that we are presently represented on, among other committees, the International Radiocommunications Advisory Council and the Radiocommunications Consultative Council, as well as preparatory groups working on agenda items for the World Radio Conferences.

licensees and reflected the value to the community of the Amateur Service.

Because Amateurs operate only in frequency bands which are available to them nationwide, a large proportion of which are secondary allocations shared with primary users on a non-interference basis, the issuing of any number of amateur licences does not increase spectrum denial. It increases spectrum sharing among amateurs which is what amateurs want, a consequence opposite to the economic foundations of the Apparatus and Spectrum licensing systems. In addition, the non-pecuniary nature of amateur interests and operations which is fundamental to the International Telecommunications Union's definition of the Amateur Service, conflicts directly with the commercial nature of these two licensing systems.

Class Licensing, the WIA also argued, does not suit amateur licensing either, as it is a system which authorises any person to operate radiocommunications devices of specified kinds or for a specified purpose, and Class Licences are not issued to individual users. Amateurs require individual licences and the freedom to operate equipment of their own choosing and/or their own manufacture.

For the reasons advanced that the Amateur Radio Service does not fit into any of the present licensing systems, the WIA submission proposes that a fourth licence system be created under Chapter 3 of the Radiocommunications Act, which would be called the Amateur Operator Licence. This would retain the current seven amateur licence sub-types and licence conditions, along with newly drafted administrative provisions similar to those which currently apply.

However, the submission proposes that certain provisions be modified and included in the government's proposed amendments to the Act, to permit either: a once-only licence issue for life to a person meeting the requirements of an AOCIP, or alternatively, provide for a five-year licence duration, with renewal. The purpose of this, the WIA submission argues, would be to reduce the administrative requirements associated with the Amateur Operator Licence, to pave the way for a future reduction in government administrative costs and thus in Amateur licence fees.

# IARU News

David Wardlaw VK3ADW

## First Report on Future of the Amateur Service Committee Discussion Paper

The International Amateur Radio Union (IARU) released last month the first report on the Discussion Paper put out by the Future of the Amateur Service Committee (FASC) in April this year.

The Discussion Paper sought informed debate by the amateur community on a number of issues, including the definition of the Amateur Service, the definition of the Amateur-Satellite Service restrictions on communications with certain (banned) countries, third party messages, the technical and operational qualifications to become an amateur, retention of the Morse code test as an ITU treaty obligation, and the international recognition of amateur licenses.

The FASC is chaired by Michael Owen VK3KI, Vice-President of the IARU, the other members being Tom Atkins VE3CDM, John Bazley G3HCT, Terry Carrell ZL3QL, Larry Price W4RA and David Sumner K1ZZ.

The 8-page report highlighted the fact that many hundreds of pages of comments had been received from societies, organisations and individuals and the Committee has summarised the variety of points and arguments submitted. The WIA sent a response to the Committee in June.

Interestingly, in response to the Discussion Paper's comments on the ITU definition of the Amateur Service, AMSAT North America has suggested the deletion of the words "interested in radio technique" from the definition: *A radiocommunication service for the purpose of self-training, inter-communication and technical investigations carried out by amateurs, that is, duly authorised persons [interested in radio technique] solely with a personal aim and without pecuniary interest.* The Committee suggests this proposal deserves further discussion.

The Discussion Paper's question on

retention of testing Morse code ability being retained or not as a treaty obligation elicited "by far the greatest response", the FASC said. Many responses addressed this issue alone. While many responses opposed the suggestion that Morse code testing should cease to be a treaty obligation, FASC reported receiving some careful arguments in favour of taking the requirement out of the international regulations and leaving it to administrations to determine whether Morse is a licensing requirement for a country.

These are just two highlights from the Committee's 8-page report. FASC said they hope this first report will be considered by the IARU Region 1 Conference this month in Tel Aviv, Israel. They propose to prepare a further report for consideration by the Region 3 Conference in 1997, to be held in Beijing, China. The process would then be repeated for the Region 2 Conference in 1998. Throughout the process, the Committee aims to seek comments and submission from individuals, groups and societies. The task of formulating a global policy, after each Region association had expressed their views, is proposed to be delegated to the IARU Administrative Council after the Region 2 Conference in 1998.

The FASC report is available on the World Wide Web at <http://www.iau.org/fasc2out.html> or via links on the various WIA Divisions' Web pages. Copies of the FASC Discussion Paper and First Report are available from the WIA Federal Councillor in your state Division.

**Support the WIA in  
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frequencies**

# Progress on Special Olympic Call Signs

In response to recent WIA representations to the SMA for use of the AX prefix by all Australian amateurs, and two special event call signs to celebrate the Sydney Olympics in 2000, to be available for a period of six months before the opening ceremony to one month after the closing, the Spectrum Management Agency has granted permission for their use for three months prior to one month after.

This means that the AX prefix and the special event call signs will be available for use from 15 June through 2 November, inclusive, in the year 2000.

At the WIA-SMA meeting on 28 June last, the WIA proposed that, in addition to a special event call sign for the Olympics to signify its international significance, that either NSW amateurs be allowed to use the VI prefix as the Olympics, being held in the State capital of Sydney, was a significant event for NSW, or alternatively that all Australian amateurs be able to use the AX prefix because the Olympics was an international event. The SMA, in their recent response to the Institute, said that they considered the use of the VI prefix would devalue the importance of the event for the whole of Australia.

Following the June WIA-SMA meeting, the WIA submitted a request for a further special event Olympics call sign, AX2SYD. (See *WIA News*, page 6, September issue of *Amateur Radio*.) The SMA has advised that, unfortunately, VK2SYD is taken, but they have reserved VK2SOG as an alternative. The SMA also said that, that if this is not acceptable, the WIA should advise preferences and check availability for reservation until after the Olympic games. The Institute is considering the matter and will reply in due course.

Apparently, the first actual application for an Olympics special event call sign was made by the Westlakes Amateur Radio Club in NSW,

who wrote the SMA the morning after it was announced in September 1993, that Sydney was selected as the host city for the 2000 Olympics. They sought VI2000AUS, or something similar. The same day, the WIA Federal President, Neil Penfold VK6NE, faxed the WIA Federal Secretary and asked him to request that the SMA reserve AX2000 or AX2000. The Federal Secretary eventually contacted the SMA on 5 October 1993, requesting AX2000 for the period of the Olympics and the use of the AX prefix by all Australian amateurs. Also on 24 September 1993, NSW Division Special Projects Officer, Stephen Pall VK2PS, discussed the possibilities of a variety of call signs with the Sydney Area Office of the

SMA. No application was subsequently made by the NSW Division, having learned of the WIA Federal application for AX2000.

In November 1994, the SMA advised the International Telecommunications Union Radiocommunications Bureau of the WIA's application for the AX2000 (AX-two thousand) call sign. The Bureau replied the following month, advising that call signs formed from two characters followed by four digits may be used for identification of ship stations in the maritime mobile service. They also said that the international Radio Regulations stipulated that all transmissions with misleading identification are prohibited. So that's the reason why AX2000 could not be issued.

While there was considerable correspondence between the SMA, the WIA and Westlakes ARC over Olympics special event call signs during the ensuing years, the rest, as they say, is history.

## Interference on 160 m Notified to SMA

Recent complaints by amateurs to the WIA of interference from strong digital transmissions in the 1800-1825 kHz segment of the 160 metre band were notified to the Spectrum Management Agency in August. This segment is an exclusive amateur allocation in Australia.

The interfering signals originate from continuously operating digital global positioning system (DGPS) beacons located in New Zealand, used for error correction in GPS satellite navigation systems. They are licensed by the New Zealand Ministry of Commerce.

Information supplied by the WIA's New Zealand counterpart, the New Zealand Amateur Radio Transmitters (NZART), advises that five licences have been issued for operation in this segment of the 160 m band, with two already in operation. The operating stations are at Napier, on 1816.5 kHz, and Wellington,

on 1818.5 kHz. These two stations run 100 watts output power to omnidirectional antennas. Other stations have been assigned frequencies of 1817.5 kHz (150 W, Dunedin) and 1822.5 kHz (150 W, Christchurch), and another on 1825.5 kHz at Wellington. It is not known when they may be operational.

The NZART has asked the Ministry of Commerce to investigate moving the three stations which had not entered service to frequencies below 1800 kHz and to seek new frequencies for the existing stations, also below 1800 kHz.

The WIA notified the SMA's Customer Service Group Technical Services Team in late August and has asked if the SMA would consider confirming the incidence of interference in Australia from these beacons and making the WIA's complaint known to the NZ Ministry of Commerce. The NZART has also been notified of the WIA's action.

# Canadian Authorities to Delegate Call Sign Assignment and Other Administrative Operations to Amateur Company

Canadian amateurs expect next year to have control of administration of their call signs, issuing of amateur certificates and maintaining certificate records and other administrative operations, proposed to be delegated by the Canadian regulatory authority responsible for spectrum management, Industry Canada, to a new not-for-profit company staffed by amateurs.

This move follows an Industry Canada funded pilot study completed earlier this year under the auspices of a joint RAC/Industry Canada committee

called the Amateur Delegation Working Group. The new company to administer the scheme is to be called Amateur Radio Administrative Services (ARAS). It is being incorporated by the Radio Amateurs of Canada (RAC) and they have set up a home page on the World Wide Web at <http://www.aras-sara.ca/aras2.htm> which outlines the background and explains its role.

ARAS will issue certificates to new amateurs and those who upgrade their qualifications, and collect the related fees. The company will also maintain

records of the level of certification of all Canadian amateurs, updated with input from official Delegated Examiners following examinations. ARAS said they will look after the management of all call signs assigned to radio amateurs in Canada, of which there are some 46,000 in the Industry Canada database. ARAS will deal with requests for new call signs and call sign changes. They intend to provide an on-line call sign database to be updated monthly, initially, but more frequently later.

The company will be managed and operated by qualified, paid professional staff, according to the ARAS home page. It will have a general manager responsible to the ARAS board of directors and will be run as an independent operation serving all Canadian radio amateurs and potential radio amateurs. It is expected that ARAS will be in operation by mid-1997.

The WIA is looking closely at this development since suggesting devolvement of call sign administration and eventual devolvement of issuing amateur certificates of proficiency in the February Exposure Draft submission to government, *Towards A New Licensing System*.

## Intruder Interference – Notify WIA Intruder Watch Coordinator

If you discover possible intruders on the amateur bands, the effective way to report them is to notify the WIA Intruder Watch Coordinator. Some amateurs have been contacting the SMA's

monitoring station at Quoin Ridge in Tasmania about interference problems from probable intruders on the bands.

The SMA has advised the WIA that their Quoin Ridge monitoring station does not accept such complaints directly. If you hear what you think is a transmission from an intruder, or you suffer interference from an apparent intruder, note down the date, time, frequency and any other pertinent facts, and send your report to the WIA Intruder Watch Coordinator in your

local Division, or to Federal WIA Intruder Watch Coordinator, Gordon Loveday VK4KAL, Freepost Rubyvale, Qld 4702.

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# Tariffs: Minister Replies to WIA

The Minister for Industry, Science and Tourism, John Moore, has replied to the WIA in response to a letter from the Federal President, Neil Penfold VK6NE, who wrote to the Minister responsible for Customs, Geoff Prosser, in May over the matter of tariffs being applied to amateur equipment which was previously imported duty free under Tariff Concession Orders.

The reply, sent on 7 August, was a form letter outlining the government's actions, with 38 pages of attachments comprising two Australian Customs Notices outlining the tariff amendments is some detail. The upshot is: imported amateur equipment ordered and landed here after 15 July 1996 will cost more than it otherwise would have. While the increase will amount to some \$30-\$50 per \$1000 of landed cost, this represents

the same order of increase in fees, in dollar terms, that the Spectrum Management Agency proposed in December 1994. The only factor which now, serendipitously, works in amateurs' favour is the appreciation in value of the Australian dollar against the Japanese Yen, as most imported amateur equipment comes from Japan.

However, the WIA's argument that the tariff represents a tax on knowledge gained through self-education still stands because, even with the current favourable A\$-Yen exchange rate, imported amateur equipment costs more than it otherwise would without the tariff.

The WIA has written to the Australian Customs Service seeking clarification of the tariffs which now apply to the Tariff Concession Orders covering specified amateur radio equipment in order to determine facts about the application of the new tariff system to amateur equipment.

## New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of August 96.

L21023	MR A DEAN	VK5DL	MR A MILLER
L30940	MR F PAPWORTH	VK6KBC	MR B E COLMER
VK2DTX	MR A S THEAKSTON	VK6SI	MR G G MATTHEWS
VK2FEJ	MR G STRATTON	VK7HSB	MR B STEVENSEN
VK2GJT	MR G J TOWELLS	VK7KAN	MR A VAN DALLEM
VK3QS	MR G E STRANGE	VK7RV	MR R H BRADSHAW



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Why on earth would a monoband VHF amateur rig need not one but two cooling fans? October's **RADIO and COMMUNICATIONS** magazine has the answer to that question — and a whole lot more. As usual, the mag is jam-packed with goodies for the active amateur, including the review of two all-new two metre FM transceivers.

*As usual, the magazine is bursting with quality articles...*

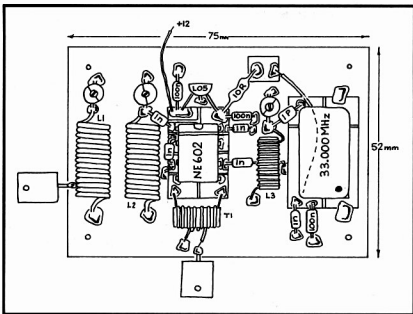
- Review: Yaesu FT-3000M. Not just a two metre rig, more like a scanner with a transceiver thrown in.
- Construction project: what antenna does a DX king use? Jim Smith describes his LPDA.
- Review: Kenwood TM-261A. This is a really sweet, compact two metre radio... and it's downright cheap!
- Modification: Update your AOR AR3000 or AR-3000A with great new features. Easy yet effective.
- Review: Weather Vox. You've heard the Data Engine put weather on packet, now put this on voice!
- Review: M1200 decoder. Can't decode those strange signals on HF? This gadget probably can...
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## Receiving Converter for 6 Metres

Amateur Radio, October 1996



**Figure 2 - Board layout for the 6 m receiving converter.**

construction method; a plain circuit board is quite appropriate to a project of this kind.

The NE602 is soldered to a small substrate pad board which, in turn, is soldered or glued to the main board. Use a junior hacksaw to form the individual lands on the substrate pads (see Ref 5). The oscillator module may also be mounted upon a small substrate, where the pad for the TTL output should be fairly small to avoid capacitive loading. Or the crystal module may simply be inverted "dead bug" fashion upon the main board.

All connections and component lead lengths should be as short as is reasonably practicable. By-pass and coupling capacitors must be either monolithic, ceramic chip or ceramic types. Take care when soldering monolithic capacitors; too much heat for too long may unsolder the lead from the actual component. It is recommended that the completed converter board be housed in a die-cast or aluminium box with coax connectors to suit your set-up. Tuning holes are not required.

The input filter coils were wound with #20 B&S (0.81 mm) enamelled copper wire, close-spaced, 15 turns each, using the shank of a 6.5 mm (or 0.25" near enough) drill to obtain correct internal

diameter. The antenna input is tapped three turns up from the "earthy" end of L1. Take care not to short adjacent turns. The variable trim capacitors should have a maximum capacitance of not more than 20 or 22 pF. Observe that the rotor of the trimmers (which connects to the slotted ferrule) is the lead soldered to circuit board foil.

The oscillator tank L3 is 15 turns of #22 B&S (0.63 mm) enamelled wire wound on an Amidon T50-6 toroidal

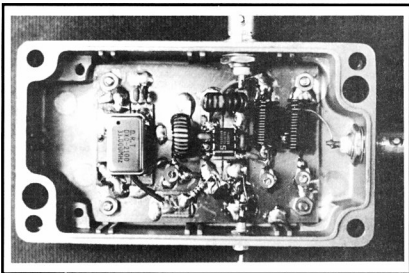
core. The 33 MHz signal is picked off through the one-turn link, simply formed by passing one lead of the 1 nF capacitor through the hole of the L3 toroid, and soldering that end to ground foil.

For the output transformer T1, wind about 12 turns of #22 B&S enamelled wire on to an Amidon FT50-43 toroidal core, and spread to occupy about 2/3rds of the circumference. The link is two turns of ordinary hook-up or enamelled wire wound in the gap.

## Tune-up

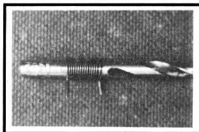
The only test equipment required is one pair of good ears and perhaps a step attenuator. With a coax cable, connect the output of the converter to the input of your general coverage receiver, which is tuned to about 17 MHz (for 50 MHz) and set to receive SSB or CW. Adjust all trim caps to about half mesh. Apply +12 Vdc supply to the converter rail. Background noise should increase a little. Check that the 78L05 is supplying +5 V to the NE602 and oscillator module. When the LO signal is peaked, you ought to hear an increase in background noise as the mixer begins functioning. Tweak the 33 MHz 20 pF trimmer for maximum noise, which should occur at about half mesh.

Connect a 6 m antenna to the input. As a prelude, adjust the two input trimmers for maximum noise, which should occur at about half mesh each.



**Top view of the 6 m receiving converter in a die cast box with the lid off.**





**A coil wound on a 6.5 mm drill shank.**

Tune to a beacon signal (see *WIA Call Book* for frequencies). For example, if the nearest beacon is on 50.057 MHz, then tune your Rx to about 17.057 MHz. If the signal is very strong, temporarily weaken it if necessary by connecting a stepped attenuator between antenna and converter input, which is switched for a signal level that just exceeds the internal noise level. Now adjust the input trimmers for what you consider best signal strength at lowest noise across the band of interest.

## Troubleshooting

To help in any necessary troubleshooting, salient voltages are shown on the schematic. Check voltages around the NE602; a badly wrong voltage would be a vital clue. To avoid breakthrough of 17 MHz short-wave signals, your general coverage receiver must be well shielded (ie of a type which is housed in a metal cabinet).

## Parts

The Amidon cores, NE602AN and passive components should be available from Truscotts Electronic World ([03] 9723 3860) and Stewart Electronics ([03] 9543 3733). Not least, check out the WIA SA Division Equipment Supplies Committee. Obtain a price list by writing to: PO Box 789 Salisbury, SA 5108 and enclose a SASE. The 33,000 MHz crystal oscillator module was purchased from Rod Irving Electronics ([03] 9543 2166) (I derive no special favours from recommending these suppliers).

## References and Further Reading

1. *VHF-UHF Manual*; Jessop-RSGB.
2. *The VHF/UHF DX Book*; Edited by Ian White, G3SEK – DIR Publishing.

3. *NE602 Primer*; Carr; Elektor Electronics Jan '92.
4. *Small Signal FET Data Book* – Philips.
5. "Paddyboard" Circuit Construction; Amateur Radio Feb 1995.

## Parts List

Capacitors	Quantity
20 pF (or 22 pF) trim cap	3
1 nF (1000 pF) monolithic	5
1 nF feed-through	1
100 nF (0.1 µF) monolithic	3
<b>Resistors</b>	
10 ohm 1/4 W	1

## Semiconductors

NE602AN

78L05 +5 V chip

## Miscellaneous

Die-cast or aluminium box, 33,000 (not 33.333) MHz crystal module, FT50-43 toroidal core, coax connectors to suit, double sided circuit board material for main board and scraps for paddyboards, #20 B&S (0.81 mm) & #22 B&S (0.63 mm) enamelled wire, hook-up wire, screws, nuts, solder, etc.

\*45 Gatters Road, Wonga Park VIC 3115

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# WIA Submission to the Department of Communications and the Arts on the Radiocommunications Amendment Bill 1996

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- 2.0 Executive Summary
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- 4.0 Radiocommunications Licensing Systems and the Amateur Radio Service
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- Appendix 3 – The Amateur Licensing System

## 1.0 Introduction

This submission responds to the exposure draft of the *Radiocommunications Amendment Bill 1996*, released by the Minister on 16 August 1996.

The Wireless Institute of Australia, the peak body representing the interests of Australian radio amateurs, seeks amendments to the Radiocommunications Act to provide a more appropriate licensing system for the Amateur Radio Service in Australia.

The submission argues a case that the present licensing systems are unsuited to the Amateur Radio Service in fundamental ways, although radio amateurs are presently licensed under the Apparatus licence system.

The WIA commends consideration of the proposed amendments to be included in the *Radiocommunications Amendment Bill 1996*.

## 2.0 Executive Summary

### 2.1 Definition of the Amateur Radio Service

The Amateur Radio Service is a unique radiocommunications service formally recognised and defined by the International Telecommunications Union (ITU). Under Australian law the Amateur Radio Service

was originally recognised under the *Wireless Telegraphy Act 1905* and under the succeeding *Radiocommunications Acts 1983 and 1992*.

As defined by the ITU, the Amateur Service is "A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

Included is the Amateur-Satellite Service, defined as "A radiocommunication service using space stations on earth satellites for the same purpose as those of the amateur service."

### 2.2 Qualifications for Radio Amateurs

Article 32 of the International Radio Regulations states that radio amateurs must have operational and technical qualifications.

In Australia, this is given effect under the *Radiocommunications Act 1992*, Section 299 (International Agreements etc) and Part 4 of the Radiocommunications Regulations – *Examinations for Certificates of Proficiency*.

In Australia, as in the rest of the world, radio amateurs are licensed as technically qualified individuals to operate a radiocommunications station in accordance with regulations and conditions set down for the Amateur Radio Service.

### 2.3 Unique Nature of the Amateur Radio Service

The ITU formally recognises the unique nature of the Amateur Radio Service, which is also reflected in the definition of the Amateur licence type as determined by Australia's SMA.

Radio amateurs have the freedom to operate equipment of their own choosing and/or their own manufacture. They have the ability to move around and

within their allocated frequency bands which extend throughout the spectrum from medium frequencies to the extra high (microwave) frequencies. Amateurs are able to change the technical aspects of their operation according to their individual interest or requirements, within their licence conditions determined under the Act.

The Amateur Radio Service has gained access to spectrum through participation in and representations made at many World Administrative Radio Conferences over the years since their inception, effectively recognising the intrinsic value of the Amateur Radio Service to the world community.

#### 2.4 Proposal for an Amateur Operator Licence

The Wireless Institute of Australia contends that the Amateur Radio Service does not fit into any of the three Australian licensing system models delineated in the Radiocommunications Act: Apparatus Licensing, Spectrum Licensing and Class Licensing.

Apparatus Licensing and Spectrum Licensing have clear commercial purposes being based on economic concepts with licence fee frameworks which reflect these concepts and purposes, while Class Licensing focuses on the licensing of prescribed equipment.

The present licensing system models each has distinct limitations or conflicts in relation to the Amateur Radio Service, its definition and activities.

Because the definition of the Amateur Service, which emphasises the non-pecuniary interest of amateur radio pursuits along with self-training and intercommunication, together with the unique nature of amateur radio activities and the requirement that radio amateurs be licensed as individuals, it is proposed that a fourth licence system be created under Chapter 3 of the Radiocommunications Act, to be called the **Amateur Operator Licence**.

This Amateur Operator Licence would recognise the complete flexibility amateur radio operators have in

pursuing their activities, within the framework of the allocated amateur frequency bands and applicable licence conditions determined under the Radiocommunications Act.

To create the Amateur Operator Licence, it is proposed that provisions be drafted to amend the Act to outline Amateur transmitter/receiver licences, types of licences, licence application procedures, duration of licences, compliance with plans and licence conditions.

In addition, it is proposed that provisions be drafted to amend the Act to outline issuing of licences, renewal of licences and other related conditions to suit the purpose and administration of the **Amateur Operator Licence**, to permit either:

- a once-only licence issue for life to a person meeting the requirements of an Amateur Operator's Certificate of Proficiency,
- or, alternatively, provide for a five-year licence duration, with renewal.

#### 2.5 The Value of the Amateur Radio Service to the Community

In support of this proposal, the WIA contends that the Amateur Radio Service is of demonstrable value to the community in many specific ways, and through these, can be said to return value to the community. For example:

- Education and self-training, providing a skilled resource in the community;
- Motivating young people to take up scientific or technological careers;
- Contribution to the advancement of scientific knowledge;
- Contribution to the development of technology; and
- Providing communications assistance during emergencies and community events.

As it is a practical impossibility to apply the Apparatus Licensing system's Spectrum Access Tax

formula to amateur operations, the Amateur Radio Service in Australia would be better served by a licence fee regime (with regard to Chapter 5, Part 5.7 of the Act) that was truly transparent, equitable for all licensees and reflected the value to the community of the Amateur Radio Service.

A purpose of proposed changes to the administration of Amateur licensing is to reduce the administrative requirements of the Amateur Operator Licence, to pave the way for a future reduction in government administrative costs and thus in Amateur licence fees.

#### 3.0 The Amateur Radio Service

The Amateur Radio Service is a unique radio-communications service formally recognised and defined by the International Telecommunications Union (ITU). Under Australian law the Amateur Radio Service was originally recognised under the *Wireless Telegraphy Act 1905* and under the succeeding *Radiocommunications Acts 1983 and 1992*.

#### 3.1 Definition

The ITU Radio Regulations define the Amateur Service as follows:

"A radio-communication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

[ITU Radio Regulations, S1.56]

Following the advent of artificial earth satellites in the late 1950s, by December 1961 a satellite designed and constructed by radio amateurs was orbiting the earth, dubbed OSCAR, for Orbital Satellite Carrying Amateur Radio. Some 40 amateur radio satellites have been launched in the intervening 30 years, the latest on August 17, 1996. This development in amateur radio is formally recognised by the ITU and a definition for the

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**Amateur-Satellite Service** has been incorporated in the International Radio Regulations.

"A radiocommunication service using space stations on earth satellites for the same purpose as those of the amateur service."

[ITU Radio Regulations, S1.57]

**Article 32 of the International Radio Regulations states that radio amateurs must have operational and technical qualifications.** In Australia, this is given effect under the Radiocommunications Act 1992, Section 299 (International Agreements etc) and Part 4 of the Radiocommunications Regulations – *Examinations for Certificates of Proficiency*.

For the purposes of licensing Australian radio amateurs, the Spectrum Management Agency (SMA) defines the Amateur licence type as:

"A station that:

- is operated for the purposes of self training in, intercommunication and technical investigation into, radiocommunications by individuals who;
- do so solely with a personal aim; and
- do not have a pecuniary interest in doing so; and
- is operated on amateur frequencies or frequency bands specified in the licence or in a technical licence specification referred to in the licence; and
- may participate in the Amateur Satellite service."

[*Inquiry Into the Apparatus Licence System – A New Outlook*, SMA, February 1995]

In Australia, as in the rest of the world, radio amateurs are licensed as technically qualified individuals to operate a radiocommunications station in accordance with regulations and conditions set down for the Amateur Radio Service.

Radio amateurs pursue their interests in the true meaning of the Latin root of the word amateur, that is, for the love of it.

The ITU formally recognises the unique nature of the Amateur Radio Service, which is also reflected in the definition of the Amateur licence type as determined by Australia's SMA.

## 3.2 Radio Amateurs' Activities

There are three "foundation stones" to radio amateurs' activities, which are enshrined in the ITU definition of the Amateur Service: self-training, intercommunication and technical investigations.

### 3.2.1 Self-training

In order to obtain the Amateur Operators Certificate of Proficiency and gain a licence, prospective radio amateurs must sit for a publicly conducted examination, comprising modules of theory, regulations and/or Morse code operation, depending on the licence sub-type desired. The system is illustrated in *Appendix L51, The Amateur Licensing System*. The Australian amateur licensing system provides for seven licence sub-types, so there are multiple "entry points" to the licensing system to accommodate candidates' interests and level of knowledge. The licence sub-types are as follows:

- Unrestricted
- Limited
- Novice
- Intermediate
- Novice Limited
- Amateur Beacon
- Amateur Repeater

The last two sub-types are unattended stations operated by interested individuals or special interest groups for the benefit of other radio amateurs. These licences are not obtained by examination.

Candidates for the first five licence sub-types all sit for multiple choice theory and regulations papers, while candidates for the Unrestricted, Intermediate and Novice licences sit for additional practical sending and receiving tests in Morse code. **The pass mark in the theory and regulations papers is 70%.**

The syllabuses for these examinations is published by the SMA (*Information for Prospective Amateur Operators*, RIB70 Revised, August 1994). The syllabuses cover basic electrical and electronics theory and technology, radiocommunications principles and technology, interference and safety. A level of knowledge is required such that licensees can assemble and operate their stations with sufficient competence such that they can carry on their pursuits and technical experiments or investigations without being a danger to themselves or others, and without causing harmful interference to other spectrum users.

Right from the outset, even before a licence can be obtained, amateur radio necessarily involves self-training. An amateur starting out at a level other than Unrestricted, must undertake further self-training in order to upgrade his or her licence level.

Having obtained a licence, radio amateurs will learn for themselves, in a practical way, about the techniques and technologies involved in radiocommunications. They have the comparative freedom and the flexibility to pursue an enormous range of radiocommunication techniques and technologies, ranging from: medium frequency transmission, propagation and reception, through high frequency (shortwave) transmission, propagation and reception, earth satellite communications techniques and digital communications technologies, television transmission and reception to microwave technologies and communications techniques, to name but a few among the vast scope of pursuits conducted.

People who have an interest in technology and gain an understanding of it through self-training are better equipped to adapt to and benefit from an increasingly technological world which is undergoing continuous and rapid change. This is particularly so for young people. The Australian amateur radio community particularly encourages young people's interest in radiocommunications technology.

### 3.2.2 Intercommunication

The purpose of assembling and operating a radiocommunication station is to make contact with other people having a like interest. Radio amateurs use their radio frequency band allocations, which are spread throughout the spectrum from the medium frequencies (MF) through to the microwave extra high frequencies (EHF), to communicate with one another.

The intercommunication may be by means of the international Morse code, which operates as a "universal language" irrespective of the amateurs' country of origin, culture or language, by voice communication, by the exchange of digital text-data transmissions, or by the exchange of images. The content of the intercommunication may be related to technical issues or it may be personal exchanges between the operators, similar in nature to having a conversation face-to-face with another person. That is, it is normal human interaction.

When radio amateurs become involved in providing communications assistance during emergencies, the intercommunication comprises important messages related to the emergency event.

Radio amateurs come from all walks of life, are found among the ordinary citizens of large cities and rural communities, in prominent businesses and scientific institutions, schools and universities, government authorities, politics, and among the world's royalty.

It is through all the varieties of intercommunication that radio amateurs continue their technical self-training and also learn the pertinent procedures necessary to establish radiocommunication contact in all the spheres available to them.

On the international scale, intercommunication between radio amateurs helps to break down not only barriers of distance, but barriers of understanding about culture and life among other communities around the world. Radio amateurs

belong to an international fraternity bound together by their mutual interest in amateur radio activities. International understanding is thus fostered through such personal and cultural exchanges between radio amateurs throughout the world.

### 3.2.3 Technical investigations

As outlined above, radio amateurs have the freedom and the flexibility to pursue an enormous range of radiocommunication techniques and technologies within the bounds of the applicable regulations and licence conditions. This freedom to conduct technical investigations is fundamental to many of the contributions Australian radio amateurs have made to the Australian community and indeed, to the Australian economy.

In order to pursue technical investigations and self-training in as many spheres of radiocommunications as possible, the Amateur Service has access to small bands of frequencies spread throughout the radiofrequency spectrum, ranging from the medium frequencies (MF), through the high frequency (HF, or "shortwave") range, right through to the upper microwave extra high frequencies (EHF). A proportion are exclusive to the Amateur Radio Service, but radio amateurs share a considerable amount of spectrum on bands allocated to primary users from other services (eg defence, industrial equipment and broadcasting). On bands where radio amateurs are secondary users, they must avoid interference to and accept the possibility of interference from, the primary users. The availability of such a wide variety of frequency bands throughout the radiofrequency spectrum provides and encourages the flexibility and freedom for radio amateurs to undertake technical investigations of an enormous variety, unfettered by limitations on access to spectrum.

Radio amateurs have gained access to spectrum through participation in and representations made at many World Administrative Radio Conferences over the years, effectively recognising the intrinsic value of the Amateur Radio Service to the world community.

When someone is able to conduct a practical technical investigation for themselves, they gain a better understanding and a deeper knowledge of the subject than by any other means. When that is driven by a strong personal interest, as it is with amateur radio activities, then that understanding is immeasurably strengthened. This principle applies regardless of the technical level of the participant and the investigation.

Knowledge and understanding gained in this way can never be trivialised. Such people become an important community asset. Where it motivates young people to take up a tertiary course in engineering or science, and/or to enter a career in electronics or telecommunications technologies, or the sciences, then the nation benefits through the addition to our skill resources and economically through their participation in the work force or through their entrepreneurship.

## 4.0 Radiocommunications Licensing Systems and the Amateur Radio Service

The *Radio Communications Act 1992* creates three licence systems for the purpose of managing access to, and the use of, the radiofrequency spectrum:

- Apparatus Licensing,
- Class Licensing, and
- Spectrum Licensing.

It is noted that the *Radiocommunications Amendment Bill 1996* does not propose to alter this three-pronged approach.

The Wireless Institute of Australia contends that the Amateur Radio Service does not fit into any of these Australian licensing system models.

### 4.1 Apparatus Licensing

This was the predominant form of radiocommunications licensing before the enactment of the *Radiocommunications Act 1992*.

The Act, **Part 3.3 – APPARATUS LICENCES**,

**Division 1 - Types of apparatus licences, says, at S.97:**

(2) A transmitter licence authorises:

- (a) the person specified in the licence as the licensee; and
- (b) subject to Division 4, any person authorised by that person under section 114; to operate specified radiocommunications transmitters, or radiocommunications transmitters of a specified kind.

Section 114 concerns authorisation of third party users to operate the equipment in the licensee's absence. In the case of radio amateurs, this is not permitted except for other licensed amateurs.

The Act also provides for transfers of licences between parties, so that equipment may continue to be used under the licence when ownership passes from one party to another, for example.

**4.1.1 Commercial Nature**

The SMA explains the role and purpose of Apparatus Licensing as follows:

"Apparatus Licensing . . . authorises the operation of radiocommunications equipment for a particular frequency, geographic location and use."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

From this it is clear that this licence system is principally suited to, and intended for, private sector and public sector business operations, as it focuses on equipment and its uses in terms of radiofrequency spectrum locations and geographic locations.

**4.1.2 Fees Framework**

The fees framework also reflects the commercial nature of the Apparatus Licensing model. This applies, in addition to administrative charges, a Spectrum Access Tax.

"The Tax is derived from a formula that takes

account of the licensee's spectrum access, in terms of four parameters:

- i. spectrum location;
- ii. geographic location;
- iii. channel bandwidth; and
- iv. area of coverage.

The tax varies according to these parameters: as the demand for the location (geographic and spectrum) increases, the tax increases; and as the amount of spectrum access increases, the tax increases."

[RB 68A, Apparatus Licence Fee Schedule, SMA June 1995]

This formula values "scarcity" and "demand", and acts as "a rationing device", according to the SMA. The formula embodies the concept of "spectrum denial". That is, a licence to operate radiocommunications equipment at a particular spectrum location (frequency), having a given channel bandwidth and area of coverage in a given geographic location is said to deny other users the use of the specified frequency and channel in the given area. The tax formula is thus fundamentally based on commercial, economic concepts.

However, because radio amateurs operate only in allocated frequency bands available to them nationwide, the issuing of any number of Amateur licences does not increase spectrum denial, it increases spectrum sharing among amateurs, which is what amateurs want. The allocated Amateur frequency bands exist under a concept similar to that of national parks, which exist for the interest and enjoyment of the community. These allocations are made in accordance with the *Australian Radio Frequency Spectrum Plan* and accord with allocations for Amateur frequency bands in ITU Region 3 determined by the ITU.

The fee framework for the Apparatus Licensing system has been severely distorted in the SMA's

application of it to Amateur licences. This distortion arises because:

- the amateur radio frequency allocations are spread throughout the spectrum from the medium frequencies (MF) through to the microwave extra high frequencies (EHF);

- a proportion of the bands are "secondary" allocations in which radio amateurs share occupancy with primary users on a non-interference basis;

- radio amateurs have the freedom and flexibility to move around the spectrum, from band to band and within their allocated bands;

- radio amateurs are free to use their band allocations and vary their equipment as they see fit, constrained in technical operation only by the applicable licence conditions determined by the SMA covering specified bands, transmission modes, bandwidths and powers, etc;

- and radio amateurs are spread throughout Australia, in cities, in rural and remote regions, and they have the freedom and flexibility to move their stations from location to location, and to operate mobile stations in land vehicles and boats.

These factors render quite meaningless the application to Amateur licences of the concept of spectrum denial related to geographic location, channel bandwidth and area of coverage in the *Spectrum Access Tax formula*.

**4.1.3 Apparatus Licences as Asset**

That Apparatus Licensing is intended for business operations is further strengthened by the fact that the *Radiocommunications Amendments Bill 1996* proposes, on page 13 in Schedule 1 (34), that Apparatus Licences are to be treated as an asset (except for S.102 broadcast services band licences).

This is anathema to the Amateur Radio Service, would appear to breach the definition of the service as set out in Section 3 of this submission, and more

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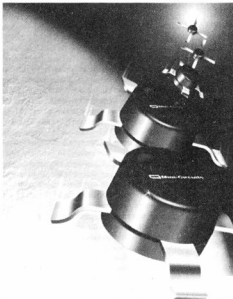
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strongly draws the Amateur Radio Service into a commercial licensing system model.

#### 4.1.4 Transfer of Licences

Further, the Act allows for transfer of Apparatus Licences between parties by a simple administrative means. Amateur Radio licences are prohibited from being transferred in this way because the individual radio amateur is licensed according to a qualification held – the Amateur Operators Certificate of Proficiency – not the capabilities of the equipment they own. A radio amateur cannot give or assign their licence to another person to use. Transferring of licences is anathema to the purpose of licensing amateur radio operators. Amateurs exchange transmitting and receiving equipment with each other, but the licence does not go with it.

Clearly this factor in the Apparatus Licensing model has distinct limitations for the Amateur Radio Service. Radio amateurs do not want the ability to transfer licences in the way conferred by the Act. It has chaotic implications for the orderly regulation of the Amateur Radio Service. Simply restricting transfer of Amateur licences by means of an administrative determination does not resolve the basic dilemma.

#### 4.1.5 Summary

The actual model for amateur radio operations is distinctly at variance with the core precepts of the Apparatus Licensing system which are of a commercial nature.

The Amateur Radio Service, by reason of its non-pecuniary nature, does not fit into the Apparatus Licensing system as presently constituted, and even less so as it is proposed to be constituted following passage of the proposed amendments.

#### 4.2 Class Licensing

Introduced with the new Act in 1992, the SMA defines Class Licensing as follows:

"A class licence authorises any person to operate radiocommunications devices of specified kinds and/or for a specified purpose, provided the operation is in accordance with the conditions of the licence. They are used where individual frequency assignments are not required.

"The SMA does not issue class licences to individual users."

[Inquiry into the Apparatus Licence System, SMA Discussion Paper, December 1993]

#### 4.2.1 Equipment

Radio amateurs require the freedom to operate equipment of their own choosing and/or their own manufacture. The establishment and operation of amateur beacons and repeaters, which have their own licence sub-type, necessitate individual frequency assignments.

#### 4.2.2 Individual Licences

Radio amateurs require individual licences. This is a fundamental consequence of the ITU definition of the Amateur Radio Service. Australian radio amateurs would likely not be recognised by the members of the International Amateur Radio Union if the Amateur Radio Service in Australia operated under a Class Licence and Australian radio amateurs did not have individual licences.

#### 4.2.3 Summary

Having regard for the requirements of the Amateur Radio Service, and noting the above definition, it is quite clear that Class Licensing is not a suitable licensing system for the Amateur Radio Service.

#### 4.3 Spectrum Licensing

The SMA defines Spectrum Licensing as follows:

"A spectrum licence authorises the licensee to operate radiocommunications equipment within core conditions (frequency and geographic boundaries, and emission limits beyond those boundaries), subject to certain other conditions. A spectrum licensee can vary the use and technical operating arrangements

within the emission limits, and assign the licence in whole or in part to a third party through trading or subleasing. Spectrum licences may be issued only in spectrum bands designated by the Minister."

[Inquiry into the Apparatus Licence System, SMA Discussion Paper, December 1993]

#### 4.3.1 Flexibility

A Spectrum Licence confers considerable flexibility of operation on the licence holder.

"Spectrum licensing, instead of focusing on equipment and its uses (which in turn defines the area covered and the frequency bandwidth used), authorises the use of spectrum within specified limits of frequency bandwidth and coverage area. Under spectrum licensing, licensees will have the flexibility to change their equipment, antenna, siting, in fact any aspect of their use of spectrum, provided they comply with the core technical conditions of their licence, and any coordination requirements."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

This sounds like almost an ideal prescription for amateur radio operations, because it allows the flexibility required by the Amateur Radio Service, but the difficulty arises as to who would be the licensee. Would there be one licensee, who would then have responsibility to regulate operations within the allocated spectrum, or would all Australian radio amateurs hold the spectrum licence jointly and severally?

Radio amateurs require individual licences. As noted previously, this is a fundamental consequence of the ITU definition of the Amateur Radio Service.

#### 4.3.2 Primary/Secondary Conflict

A number of Amateur frequency bands are allocated on a primary-use basis and others are shared by radio amateurs with primary users from other radiocommunications services (eg defence, broadcasting).

If radio amateurs were Spectrum Licensed, this mixed primary/secondary status could create a technical conflict of usage and rights where frequency bands are shared with other services, as well as administrative difficulties in the resolution of occupancy and interference.

#### 4.3.3 Commercial Purpose

The clear primary purpose of Spectrum Licensing is the ability to assign, trade or sublease the licensed spectrum, in whole or in part, granting rights analogous to property rights in the radiofrequency spectrum.

"A spectrum licence provides the licensee something like a property right, where the licensee can trade and subdivide the spectrum to other users."

[Speech to the Wireless Technology Forum, Sydney, 15 February 1996, by the Spectrum Manager, Christine Good]

For similar reasons advanced in regard to transfer or trading of Apparatus licences, this aspect of the Spectrum Licensing model conflicts with the requirements of the Amateur Radio Service.

Likewise, restricting spectrum licence assignment for the purpose of Amateur licensing by means of an administrative determination would not resolve the basic dilemma.

Spectrum Licensing has a clear commercial purpose, particularly borne out by the fact that Spectrum Licences for bands of frequencies designated for Spectrum Licensing will be sold by the SMA by auction, tender or offer.

The Government's policy framework relating to charges to be levied for Spectrum Licences provides that:

"new spectrum licences will generally be allocated by a price-based allocation system which recovers the scarcity value of the spectrum;

- all spectrum licensees will also be required to pay a separate annual fee related to the costs of administration of spectrum management; and
- the SMA will be able to reserve spectrum licences for direct sale to public and community service providers, in some cases at concessional rates."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

Clearly, Spectrum Licensing is a framework for "spectrum for sale" in a like manner to real estate.

#### 4.3.4 Uncertainty of Renewal

A Spectrum Licence is more akin to a leasehold rather than a freehold property title, because it has a limited tenure without presumption of renewal.

"The Act provides that a spectrum licence may be issued for a period of up to 10 years, but there will be no automatic right for a person to be issued a second spectrum licence after the expiration of their first."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

The Act provides a mechanism for renewal, but with a "public interest" test.

"The Act provides that the SMA may re-issue a spectrum licence to the original licensee without following the re-allocation procedures which would normally apply if that would be in the public interest.

"The 'public interest' in this case is able to be determined by the Minister, but any determination by the Minister is a disallowable instrument, able to be disallowed by either the House of Representatives or the Senate during the 15 sitting days after tabling.

"The SMA expects that only very few situations will actually meet public interest criteria, for example, volunteer community or public services."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

Clearly, this mechanism has a deal of uncertainty associated with it.

Radio amateurs want the certainty of continued access to their allocated spectrum and the renewal of their licences from period to period, so this aspect of the Spectrum Licensing system is anathema to radio amateurs.

#### 4.3.5 Summary

It is clear the role of Spectrum Licensing and the requirements of the Amateur Radio Service, while having some congruence, have fundamental differences and Spectrum Licensing is not a suitable system for the Amateur Radio Service.

## 5.0 Towards a New Amateur Radio Licensing System

### 5.1 Amateur Radio Activities and the Licensing Systems

Amateurs operate radiocommunications stations comprising equipment which may:

- be designed and constructed by themselves;
- be assembled from units of commercially manufactured equipment originally designed for civilian, government or military applications, and adapted or modified for amateur radio pursuits;
- be assembled from commercially manufactured equipment designed for the world amateur radio market; or
- comprise a variety of combinations and permutations of the above.

Radio amateurs operate their stations on bands allocated under the Australian Radiofrequency Spectrum Plan (published by the SMA). These bands range from the medium frequencies (MF) through to the microwave extra high frequencies (EHF). Radio amateurs operate within the specified limits of these bands and are only constrained in technical operation by

the applicable licence conditions covering specified bands, transmission modes, bandwidths and powers, etc. Radio amateurs have total flexibility to change their equipment, transmission modes, location and antennas, provided they comply with the core technical conditions of their licence, and any coordination requirements. This flexibility is essential to maintaining technical experimentation as one of the core activities and attractions of amateur radio.

By the very nature of radio amateurs' activities, the equipment used changes as the interests, pursuits and goals of the individual amateur change.

**Among all the defined radiocommunications services, amateur station operation is unique.**

#### 5.1.1.1 Limitations of Present Licensing Systems

As has been demonstrated earlier, Apparatus Licensing is a poor licensing model for amateur radio activities because it is prescriptive, as it

"authorises the operation of radiocommunications equipment for a particular frequency, geographic location and use."

[Implementing Spectrum Licensing, SMA Discussion Paper, February 1995]

Apparatus Licensing is particularly suited to, and widely used by, private and public sector services as it is fundamentally based on commercial, economic concepts.

Likewise, it has been demonstrated that **Class Licensing** is not suitable for general licensing of amateur radio operators as it authorises the operation of "... radiocommunications devices of specified kinds and/or for a specified purpose ... The SMA does not issue class licences to individual users."

[Inquiry into the Apparatus Licensing System, SMA Discussion Paper, December 1993]

Similarly, **Spectrum Licensing** has limitations for general licensing of radio amateurs, as many amateur radio frequency bands are shared with primary users, while radio amateurs have primary occupancy on many other bands. In addition, the 10-year tenure of a Spectrum Licence, without presumption of renewal, does not suit the reason-for-being and activities of the Amateur Radio Service.

**Radio amateurs have always been licensed as technically qualified individuals and by the very nature of their activities, require individual licences.**

#### 5.2 The Present Amateur Licensing System

Amateur radio operators are presently licensed under the Apparatus Licensing system. The licence type is categorised as **Amateur**, under which there are seven sub-types, as follows:

Unrestricted  
Limited  
Novice  
Intermediate  
Novice Limited  
Amateur Beacon  
Amateur Repeater

The last two sub-types are unattended stations operated by licensed individuals or special interest groups for the benefit of other radio amateurs.

A person wishing to gain an amateur radio licence has to sit for a publicly conducted examination, comprising modules of theory, regulations and/or Morse code operation, depending on the licence sub-type desired. The system is illustrated in **Appendix L.S1. The Amateur Licensing System**. Candidates sit for multiple choice theory and regulations papers, and for practical sending and receiving tests in Morse code. The pass mark in the theory and regulations papers is 70%.

The amateur radio community's peak body, the Wireless Institute of Australia (WIA), has conducted the nationwide amateur examination service on behalf of the Spectrum Management Agency (SMA), operating under a Memorandum of Agreement, since 1992 when the SMA devolved the examination routine to the WIA. This service is formally known as the **WIA Exam Service**.

Accredited invigilators supervise candidates sitting for the amateur licence examinations. The WIA has drafted examination syllabuses and questions banks and negotiated approval with the SMA. So, all the routine aspects of administering the amateur exam system are conducted by the WIA.

Upon receiving notification of the necessary pass mark in the required examination modules, a candidate applies to the Spectrum Management Agency for them to issue the necessary Certificate of Proficiency. This Certificate is issued to the individual and is unique to that person, just as is a Higher School Certificate. The SMA assigns the candidate a Customer Number. Again, this is unique to the individual.

Upon receipt of an Amateur Certificate of Proficiency, the candidate applies for a licence and call sign. The licence is renewable at annual or 5-yearly intervals. A radio amateur's Certificate of Proficiency is held for life (even if their licence lapses through non-renewal, is relinquished, is suspended or revoked by the SMA), but a call sign may be taken up and relinquished or changed as the licensee sees fit.

#### 5.3 Amateur Licence Fees

Amateur licence fees are currently determined under the general Apparatus Licence fee framework which is shown in Section 4 of this submission to be based on commercial, economic concepts.

Radio amateurs operate in defined frequency bands and have the flexibility to, at will, use transmissions of differing bandwidth, transmit on different frequencies within their assigned bands (many of which are shared with other primary users or shared internationally), and to change their location. Hence, it is a **practical impossibility to apply the Apparatus Licensing system's Spectrum Access Tax formula to amateur operations.**

In the case of radio amateurs, their licence fees are paid out of private income, and are recurrent expenditure. As a consequence of the ITU definition of the Amateur Service, radio amateurs cannot have a pecuniary interest in their pursuits and thus licence fees must be paid from their private income. From WIA membership statistics, it is estimated that between one-fifth and one-quarter of Australia's radio amateurs are either students, retirees or pensioners, on restricted incomes. The WIA scale of membership fees reflects this fact, with reduced payments available to members in these circumstances. But it must be acknowledged that radio amateurs who are students or pensioners also make their collective contribution in being of value to the community.

**The Amateur Radio Service in Australia would be better served by a licence fee regime (with regard to Chapter 5, Part 5.7 of the Act) that was truly transparent, equitable for all licencees and reflected the value to the community of the Amateur Radio Service.**

The issue of minimising the cost of administration of Amateur licensing and thus licence fees is to be taken up in a separate submission to the Minister for Communications and the Arts.

#### 5.4 Proposal for a New Licence

It has been shown that the Amateur Radio Service in Australia does not fit into the present three licensing systems under the Radiocommunications Act.

#### 5.4.1 An Amateur Operator Licence System

Owing to the definition of the Amateur Service, which emphasises the non-pecuniary interest of amateur pursuits along with self-training and intercommunication, together with the unique nature of amateur radio activities and the requirement that radio amateurs be assessed as individuals, it is proposed that a fourth licence system be created under Chapter 3 of the Radiocommunications Act, to be called the **Amateur Operator Licence**.

This Amateur Operator Licence would recognise the complete flexibility amateur radio operators have in pursuing their activities, within the framework of the

allocated amateur frequency bands and applicable licence conditions determined under the **Radiocommunications Act**. The present seven licence sub-types would be retained.

#### 5.4.2 Provisions and Conditions

It is proposed that provisions similar to Sections 97 (transmitter and receiver licences), 98 (types of licence), 99 (applications for licence), 103 (duration of licences), 104 (compliance with plans), 107 (licence conditions), and 108 (additional conditions for transmitter licences) of the Act would be drafted to apply to the **Amateur Operator Licence**.

#### 5.4.3 Administrative Provisions

It is also proposed that provisions such as those in Sections 100 (issuing licences), 129 (application for renewal), 130 (renewing licences) and 131 (other provisions) of the Act be modified and included to suit the purpose and administration of the **Amateur Operator Licence**, to permit either:

- a once-only licence issue for life to a person meeting the requirements of an Amateur Operator's Certificate of Proficiency,
- or, alternatively, provide for a five-year licence duration, with renewal.

The purpose of this would be to reduce the administrative requirements associated with the Amateur Operator Licence, to pave the way for a future reduction in government administrative costs and thus in Amateur licence fees.

#### Appendix 1 - The Wireless Institute of Australia

**Appendix 2 - The Value of the Amateur Radio Service to the Community**

#### Appendix L.S1 - The Amateur Licensing System

- All extracted from the WIA Submission exposure draft.

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## ■ Equipment Review

# Yaesu MD-100A8X Desk Microphone

Reviewed by Ron Fisher VK3OM\*



Yaesu MD-100A8X microphone.

When I wrote the review of the FT-1000MP I mentioned that I would like to look at the matching Yaesu desk microphone, the MD-100A8X. I guess that Chris Ayres, Dick Smith's amateur radio guru, must read our reviews because a few weeks later an MD-100A8X arrived at the Federal office along with another FT-1000MP to try it out on. No doubt about it, an equipment reviewer's life is never dull.

Just in case you haven't seen one of these very elegant microphones, let me tell you all about it. Firstly, it is a brand new design quite different from the older Yaesu desk microphones. It is now very smooth and rounded and not as heavy looking as some of the previous models. According to the advertising material, and also the operation sheet that comes with the microphone, it is described as having "a heavy diecast base and a high impact plastic mic housing".

The last point is right, but the first is wrong. The base is not diecast at all, but

plastic. The "heavy" part comes from a collection of steel bars glued to the bottom plate. I wonder if any MD-100A8X were ever made with diecast bases or perhaps Yaesu just assumed they were when the delivery came from the Japanese Microphone Company. I assume that Yaesu don't actually manufacture their own microphones. I might be wrong.

In actual fact, diecast or not, the whole thing is very well made and I cannot see that it is in any way inferior for having a plastic base. But Yaesu do need to put their advertising right. (*Stop Press! Yaesu have been advised by Dick Smith Electronics and will amend the instruction sheet.* Ed)

### MD-100A8X Features and Facilities

The microphone element is a 500 ohm dynamic mounted to give a cardioid response. That is, it has a pronounced front to back ratio in its sound pick-up pattern. This means that

it will not respond to noise from the back and sides and results in a much cleaner overall sound compared to a non-directional microphone.

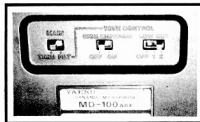
However, the interesting part is the electronics that are built into the base. Here are circuits that provide two positions of bass cut and one position of high boost. Yaesu don't tell us how this is done, and there is no circuit diagram supplied. The whole thing is built on to a shielded circuit board which would require quite a bit of unsoldering to get to. I drew a line at this point.

The bass cut and high boost are controlled with three miniature switches set into the underneath of the base (see photograph). The push-to-talk bar is set right at the front of the base with a PTT lock button on the left hand side. The scanning control is unusual in that it is spring loaded, holding it in the centre position, with a slight pressure needed to produce either up or down scanning. More pressure brings in fast scanning, but note that this control is not (unfortunately) a duplicate of the shuttle-jog tuning of the FT-1000MP.

The base of the MD-100A8X is connected to the microphone with a short lead terminating in a standard eight pin metal line socket that mates with the microphone. On the rear of the base are two output connectors. The first is a metal eight pin plug, the second a modular eight pin plastic socket. Our review microphone was not supplied with the standard connecting lead to go to the transceiver so the lead for the MH-31 hand mic was unplugged from the microphone body and the modular plug connected to the socket on the base of the MD-100A8X.

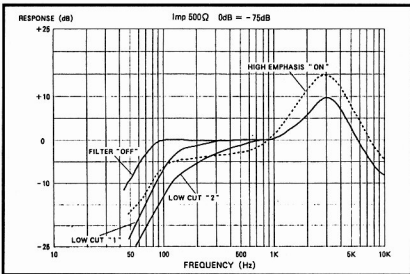
### Performance

On-air reports were very favourable with the high boost switched out, but most thought it sounded too sharp with



Bass cut and high boost controls under the base of the microphone.





Frequency response curves of the MD-100A8X microphone.

the boost in. I have included the response curve as supplied with the microphone, which shows that, even in the normal position, there is quite a bit of high frequency boost. Perhaps the extra high frequency output might be useful under very poor conditions.

The two bass cut positions did not affect the quality to any great extent. The first bass cut position produced no audible effect at all while the second gave a just noticeable reduction in the low end.

Well, on-air tests are interesting, but you have to rely on what other people think, so I decided to make up some adaptors to connect the MD-100A8X to a good quality tape recorder and see just what it sounded like. While on the job, I also decided to check out a variety of other microphones as a comparison. The results were, to say the least, very interesting.

Firstly, on air reports indicated that the MD-100A8X on the FT-1000MP and my usual station set-up of a Shure 444 and a TS-940S sounded very similar. However, listening to the two microphones on tape, they were totally different. In fact, the Shure 444 was without doubt the worst sounding microphone of all tested. It sounded very peaky and far too sharp.

The MD-100A8X, on the other hand, had a very clean transparent sound with excellent highs and well balanced bass response. I checked out several hand

microphones, including the MH-31 as supplied with the FT-900 and FT-1000MP. Most of these produced a boxy sound that was absent with all the desk microphones. In fact, there was far less difference between sound quality of the hand microphones than the desk mics with the exception of the Shure 444. Some of the other microphones tested were the Kenwood MC-50, MC-60, MC-42, MC-35 and the MC-10, a very old hand microphone with much better than average quality.

### MD-100A8X Conclusion

If you would like to improve your transmitted audio quality, then a desk microphone is the right way to go. The MD-100A8X produces superb audio from the FT-1000MP.

However, beware! Good audio from a good microphone is the beginning. But you also need a transmitter which is capable of producing good distortion-free quality with the response from the filter properly set-up. There are many transmitters out there that don't meet the above requirements.

At a list price of \$229 the MD-100A8X is not cheap, but it will produce quality you can be proud of. Thanks to Dick Smith Electronics for the loan of the MD-100A8X and the FT-1000MP to go with it.

\*24 Sugarloaf Road, Beaconsfield Upper VIC 3808

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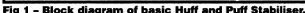
ACN 006 092 575

*Gil Sones VK3AUI\**

A VFO stabiliser known as the "Huff and Puff Stabiliser" has been described in RSGB publications over many years. It is the brainchild of Klaas Spaagaren PAOKSB and originally appeared in Pat Hawker's *Technical Topics* column in *RadCom* in 1973. The circuit enables a VFO to be locked to a comb generated from a crystal oscillator with the result that the oscillator can be locked every few Hertz. This enables a good VFO to be stabilised with a stability

In the February 1996 issue of *QEX*, Klaas Spaargaren PA0KSB published an improved version of the technique. This also appeared in *RadCom* in July 1996 in Pat Hawker's *Technical Topics* column. The improved circuit uses a different arrangement with a higher-order frequency crystal oscillator. The basic arrangement is shown in Fig 2. The output of the digital mixer and a clock

*QEX* can be obtained on subscription from the ARRL or single copies are available at Daycom Communications Pty Ltd.



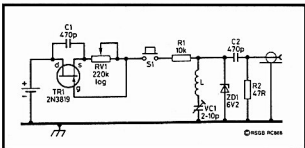


Fig 4 - Noise generator.

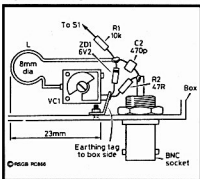


Fig 5 - Layout of tuned circuit and components.

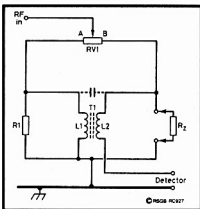


Fig 6 - Bridge circuit.

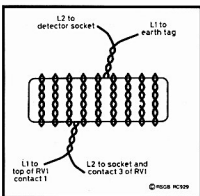


Fig 7 - Winding of ferrite transformer.

## Noise Generator

A useful noise generator was described in *RadCom* for February 1996 by Sven F Weber G8ACC. The noise generator is powered by one of the small alkaline 12 volt batteries used in remote controls and other appliances. The output was sufficient for a variety of uses up to the 432 MHz band. It can be used for receiver alignment as well as to compare receiver sensitivity, and has enough output to drive an impedance bridge.

The circuit of the noise generator is shown in Fig 4. The FET is used as a current source and the noise is provided by the current through the Zener diode. The inductor and capacitor provide compensation on 432 MHz and the capacitor is used to peak output at 432 MHz. The potentiometer varies the current and hence the noise output. The layout of components is shown in Fig 5. A small metal box should be used for construction.

## RF Impedance Bridge

A simple RF Impedance Bridge companion to the noise generator was described in *RadCom* for March 1996 by Sven F Weber G8ACC. It uses a 100 Ohm Cermet potentiometer as the variable element and a transformer which is bifilar wound on a small ferrite toroidal core.

The circuit of the bridge is shown in Fig 6. The winding of the ferrite transformer is shown in Fig 7. The resistor R1 is a 100 ohm metal film resistor. The ferrite core is a T37-12

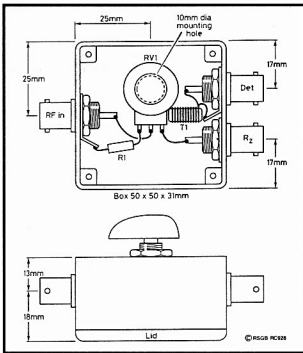


Fig 8 - Layout of bridge in small box.

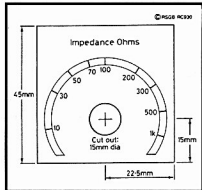


Fig 9 - Scale from original bridge.

ferrite core of 10 mm OD and is 4 mm wide. The winding is 10 turns of a closely twisted pair of 26 or 28 SWG enamelled wire. The core is supported by the short wire leads going to the sockets. The layout of the bridge in a small box is shown in Fig 8.

The bridge can be calibrated by using a series of small standard value resistors to give calibration points. The scale obtained with the original is shown in Fig 9. Operation up to 30 MHz is fairly easy and, with care, operation into the VHF region is possible. A carbon linear pot would work up to 30 MHz.

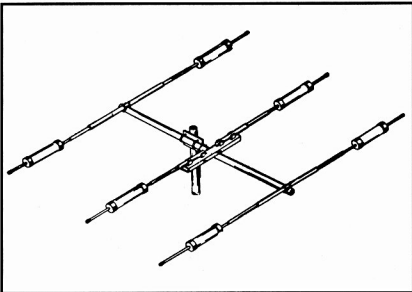
\*Clo PO Box 2175, Caulfield Junction VIC 3161

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## ■ Antennas

# Random Radiators

with Ron Cook VK3AFW and Ron Fisher VK3OM\*



The Mosley TA-33 as used by Jim Andrews VK2BO.

## Triband Trap Beams Again

After our discussion on triband trap beams several months ago, we were surprised that it brought very little reaction. In fact, there was no defence of the performance of these beams at all; that is, until now.

A letter from Jim Andrews VK2BO puts the other side. I hope it might inspire others to tell us of their experiences with these antennas good or bad. So over to Jim to tell his story. "Each year after the Remembrance Day contest when I have worked you a couple of times, I decide I will drop you a note and disagree with one of your themes in Random Radiators. Recently you mentioned once again your doubts on trapped beams, particularly the triband Yagi type. I have been using a Mosley three element tribander which first went up in 1962. While it has had three lots of cable replaced, it has never been taken down for servicing, my motto being "let sleeping dogs lie".

Also, I do a lot of QRP work using a Heathkit HW-7 with two watts output. This has given me 80 countries on 20 metres using the Mosley tribander.

After your original comments, I put up a dipole running north-east by south-west, which would favour Europe on both short and long path. At this time I was working into Europe each evening short path running two watts into the beam. I called DL1SV on the beam and received 559. Then I called him on the dipole and he couldn't copy me. He got me again when I went back to the beam.

I tried this test with several European stations on both long and short path and could never raise them on the dipole. When using the higher power of 15 watts from an FT-7, I could get into Europe but with signals down 4 to 5 "S" points compared to the beam.

Doubts about the efficiency of the dipole? Well, it was running at about 35 feet using a current balun. I always use current baluns which I find superior to commercial voltage types. The SWR was

flat at 14.050 MHz and it worked quite well on high power.

Later, I put up my old 20 metre ground plane antenna. The base was 20 feet above ground with four sloping radials which also served as guy wires. This antenna had been used very effectively before I installed the triband beam. The dipole was taken down and that co-ax feed (RG8U) was used. The length of the radials and radiator were adjusted to give a 1:1 SWR at 14.100 MHz. The SWR was checked by adding a seven foot length of RG8 to make sure that it was not the length of the feed line that was producing the 1:1 SWR.

This ground plane was quite good into the USA, Canada and Japan, and also seemed to be as good into Europe as the dipole. However, I could not check one against the other because only one feed line was available. I could not raise Ws and VEs using the ground plane and two watts, but could if I used the beam. With high power, the ground plane was OK into the USA but down by about three "S" points compared to the beam.

So, from observation only, I find the beam works much better than either the ground plane or the dipole when using QRP. During the RD contest I found the beam very good on 20 and 10 metres but I know on 15 metres it doesn't get near the makers specs".

Thanks Jim for your thoughts on beams. Perhaps some trap beams are better than others. We hope other readers might have a say on the subject.

## Open Wire Feed Lines

We are asked from time to time where open wire feeder cable can be obtained. Well, there is open wire feeder cable available on the market.

We know that Daycom Communications Pty Ltd in Melbourne sell 400 ohm cable which looks like over grown 300 ohm TV feeder. I (one of the Rons) have never used it, so I can't comment on its performance. There is quite a lot of plastic between the wires so it might detune when wet.

One of us uses the old 300 ohm open wire TV feeder which was sold by Hills Industries for fringe area reception. Unfortunately, it hasn't been available for years. I believe it was made in Taiwan and imported into Australia.

Perhaps it's still being made. If so, there is a market out there waiting.

However, there is an alternative. Make your own! A letter from Maurie Phillips VK5ZU describes how he goes about it. It might be worth a try. Over to Maurie. "From time to time I hear discussion on air regarding sources of supply or methods of construction of open wire feed lines. I build my own using the following materials. For spreaders I use 1/4 inch black nylon tube as used for domestic irrigation systems. They are known as rigid risers and are available at K Mart and most hardware stores.

The conductors I use are 40/0076" black PVC insulated flexible conductor as used for 10 amp rated 240 volt circuits. As an alternative, you could use 23/0076" as used for 5 A rating on 240 volt circuits. I purchased mine in pre-metric days as single core on a 100 yard reel.

An alternative would be to purchase two core figure-eight household flexible and split it. Black PVC covering is preferred to give some resistance to deterioration from ultraviolet radiation.

### Construction

Cut the spreaders to the desired length. This will generally only be critical if the feed-line impedance is required to match the antenna impedance. A good choice would be about 4 to 5 cm spacing. Using a heated steel nail make shallow slots at opposite ends of the spreaders ensuring that they are parallel to each other. Then drill holes about 5 mm in from the slots to hold your tie wires. The spreaders are spaced at about one metre intervals".

Thanks for your ideas Maurie. If you are building a G5RV this might be the answer for a low loss feeder. You could even try different feeder spacing to achieve a better match. Of course, one of the Rons doesn't like G5RV antennas unless the open wire feeder goes right into a balanced ATU such as a Z match. But that's another story. So for now, it's goodbye from me and goodbye from him.

### The two Rons

\*C/o PO Box 2175, Caulfield Junction, VIC 3161

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## ■ Propagation The Maunder Minimum

*Paul Clutter VK2SPC\* has been studying the history of sunspots.*

How would you like to have about 100 years of continuous exceptional DX capabilities on all bands? Well, that was the case during the 12th and early 13th centuries AD but, unfortunately, there was no radio to take advantage of it. However, there have been periods of high solar activity lasting for over 17 years.

On the down side, there have been short periods of 7.3 years and, worst of all, evidence from various sources shows that there have been long periods with a lack of any solar activity at all.

The first sunspot cycle to be recorded began in 1775 and is referred to as cycle one. Cycle 23 will be high just after the year 2000. One of the highest number of sunspots (201) was counted in 1957.

The most recent long term minimum is a seventy year period beginning about 1645 AD. This period has been named the "Maunder Minimum" after E W Maunder who was the Superintendent of the Solar Department of Greenwich Observatory in the late 1800s. During those seventy years, there appears to have been little or no solar activity at all. This period is also known as the "Little Ice Age" in Europe, but it has not been established if this was caused by low sunspots.

Another long period apparently began about 1460 AD and extended about ninety years. Analysis of the carbon 14 isotope in tree rings is used to record solar activity going back beyond the few hundred years available by sunspot numbers. The carbon 14 isotope is formed continuously in the atmosphere by the action of cosmic rays and the level of cosmic rays entering the atmosphere is modulated by solar activity. When the sun is quiet, the carbon content rises, and is lower in times of high solar activity. The carbon 14 is assimilated by the trees along with

carbon dioxide and shows up in the annual growth rings.

On the other hand, carbon 14 data indicates a long period of exceptionally high solar activity in the 12th and early 13th centuries AD.

Carbon dating, developed just after WW2 by Willard F Libby and co-workers, can go back 70,000 years. Substances with carbon 14 are wood, charcoal, marine and freshwater shell, bone and antler, peat and organic bearing sediments, carbonate deposits, dissolved CO<sub>2</sub> and carbonates in ocean, lake and ground water sources.

From this information, we can conclude the eleven year cycle may not be a regular feature in the "pulsing" life of the sun.

\*52 Keats Avenue, Bateau Bay NSW 2261

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## WIA News

### Overseas Visiting Amateurs Can Pay Lower Licence Fee

Following representations to the Spectrum Management Agency at the WIA-SMA meeting in November last year concerning the SMA charging the full \$51 for reciprocal licences for amateurs visiting from overseas, even if they stayed only a few weeks, the SMA has advised that they have a minimum licence charge of \$24 which would apply in such circumstances.

This would allow, on a pro rata basis, a visiting amateur to use a reciprocal licence for a maximum period of 105 days, or about three and a half months. The \$24 minimum fee applies even if the reciprocal licence is only required for a few days or weeks, the SMA said.

## ■ Antennas

# Horizontal Antennas Above Real Ground

*Ralph Holland VK1BRH\* explores the relationship between antennas and ground.*

## Introduction

Antennas are influenced by the effect of the ground and by the type of conductors from which they are constructed. The feedpoint impedance is the summation of the radiator's self impedance, the mutual impedance of its image in the ground, and the loss resistance. The loss resistance is the summation of the RF resistance in the conductor, and the resistance introduced by consumption of power in ground losses and other media close to the antenna. The conductor's resistance is modified by the skin-effect which causes the current to only flow in the outer parts, or skin, of the conductor. The effect causes the resulting

resistance to increase in proportion to the square root of the frequency (see Tables 1 and 2).

Horizontal antennas are subjected to the influence of a broadside image in the ground. The antenna and its image are in anti-phase, so radiation tends to be cancelled at low angles and the radiation resistance is lowered because the mutual impedance of the image is subtracted from the self-impedance of the driven element.

Modelling to quantify the effects of locating antennas above real ground I have, once again, resorted to computer modelling using NEC-2 (Ref 1). All simulation results have been performed

with 1.22 mm diameter wire (SWG #18) and the assumption of loss-less conductors.

The simulation results are displayed graphically so you can determine the trends and evaluate your own antennas. The soil parameters for each simulation are enclosed in square brackets. For example, [13,5] represents ground with a relative dielectric constant of 13 and conductivity of 5 milli-Siemens/m ( $2S = 1/2 \text{ ohm}$ , while  $4S = 1/4 \text{ ohm}$ ). The selected values are: [5,1] for poor soil, [13,5] for average clay soil, [20,30.3] for good soil and [80,5000] for sea water, which is very close to perfect. Table 1 and Table 2 are included so you can evaluate conductor resistance losses due to the skin effect (Ref 2).

## Results

Fig 1 shows the effects of various types of grounds on a 1.825 MHz horizontal 0.5 wave dipole between 0.01 and 0.25 wavelengths above the ground. Note how, over poorer soils, the feedpoint impedance is dramatically higher than the resistance for perfect ground. Also, notice how the feedpoint resistance for a horizontal antenna becomes very low as the antenna

B&S AWG	dia mm	Dc. mOhm/m	Ohm / Lambda							
			1.825 MHz	3.5 MHz	7.0 MHz	10.1 MHz	14.2 MHz	18.1 MHz	21.2 MHz	29.0 MHz
36	0.13	1356.4	329.59	195.37	114.92	89.43	71.08	60.62	54.77	44.84
34	0.16	841.0	223.82	135.88	82.17	64.82	52.16	44.84	40.72	33.64
32	0.20	536.5	158.03	98.24	60.95	48.64	39.54	34.21	31.19	25.94
30	0.25	337.1	112.16	71.47	45.44	36.65	30.05	26.14	23.90	19.99
28	0.32	212.2	81.15	52.94	34.38	27.97	23.09	20.17	18.48	15.52
26	0.40	133.5	59.67	39.76	26.28	21.52	17.85	15.64	14.36	12.10
24	0.51	83.9	44.56	30.23	20.26	16.67	13.89	12.20	11.21	9.47
22	0.64	52.8	33.72	23.20	15.71	12.98	10.84	9.54	8.78	7.43
20	0.81	33.2	25.82	17.96	12.26	10.16	8.51	7.50	6.91	5.85
18	1.02	20.9	19.89	13.96	9.59	7.96	6.68	5.89	5.43	4.61
16	1.29	13.1	15.44	10.90	7.52	6.26	5.26	4.64	4.28	3.64
14	1.63	8.3	12.04	8.54	5.92	4.93	4.15	3.66	3.38	2.87
12	2.05	5.2	9.42	6.71	4.66	3.89	3.27	2.89	2.67	2.27
10	2.59	3.3	7.40	5.28	3.68	3.07	2.59	2.29	2.11	1.80
5	4.62	1.0	4.07	2.92	2.04	1.71	1.44	1.27	1.18	1.00
1	7.35	0.4	2.54	1.83	1.28	1.07	0.90	0.80	0.74	0.63
	25.40	0.0	0.73	0.53	0.37	0.31	0.26	0.23	0.21	0.18
	100.00	0.0	0.18	0.13	0.09	0.08	0.07	0.06	0.05	0.05
	500.00	0.0	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.01

**Table 1 AWG round copper wire resistance.**

SWG	dia mm	Dc. mOhm/m	Ohm / Lambda							
			1.825 MHz	3.5 MHz	7.0 MHz	10.1 MHz	14.2 MHz	18.1 MHz	21.2 MHz	29.0 MHz
36	0.19	587.1	169.23	104.70	64.63	51.47	41.75	36.09	32.87	27.31
34	0.23	400.6	127.14	80.28	50.59	40.66	33.23	28.86	26.36	22.01
32	0.27	290.7	100.94	64.82	41.51	33.58	27.59	24.04	22.00	18.43
30	0.31	220.5	83.30	54.24	35.17	28.59	23.59	20.60	18.88	15.85
28	0.38	154.8	65.72	43.51	28.61	23.38	19.37	16.96	15.56	13.10
26	0.46	104.7	51.11	34.39	22.91	18.81	15.64	13.72	12.61	10.64
24	0.56	70.1	39.92	27.24	18.34	15.12	12.61	11.08	10.19	8.62
22	0.71	43.3	30.02	20.76	14.11	11.68	9.77	8.60	7.92	6.70
20	0.91	26.2	22.55	15.76	10.80	8.96	7.51	6.62	6.10	5.17
18	1.22	14.7	16.42	11.58	7.98	6.64	5.58	4.92	4.54	3.85
16	1.63	8.3	12.05	8.55	5.92	4.94	4.15	3.67	3.38	2.88
14	2.03	5.3	9.52	6.78	4.71	3.93	3.31	2.92	2.70	2.29
12	2.64	3.1	7.24	5.17	3.60	3.01	2.53	2.24	2.07	1.76
10	3.25	2.1	5.84	4.18	2.92	2.44	2.05	1.82	1.68	1.43
5	5.38	0.8	3.48	2.50	1.75	1.46	1.23	1.09	1.01	0.86
1	7.62	0.4	2.45	1.76	1.23	1.03	0.87	0.77	0.71	0.61

**Table 2 SWG round copper wire resistance**

approaches a perfect earth (the feedpoint resistance of a perfect conductor over a perfectly conducting ground is the radiation resistance of the antenna).

Fig 2 illustrates the overall antenna efficiency; a measure of how much power is radiated over the hemisphere, compared to power fed into the antenna (the missing power is absorbed by the ground).

Fig 3 illustrates the effect upon the

maximum gain. However, at 160 m, poor ground means the maximum gain is at an elevation of 90 degrees, ie straight up!

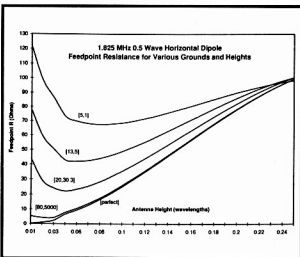
Figures 4, 5, and 6 show the effect upon feedpoint resistance at 3.5 MHz, 7.0 MHz and 14.0 MHz respectively.

Table 1 and Table 2 give the RF resistance of round copper wire at various frequencies. The values are listed in ohms per wavelength. You must

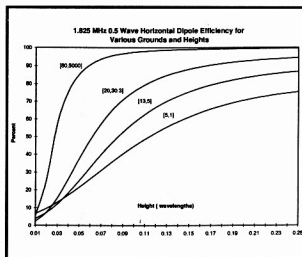
halve these values for wires carrying cosinusoidal currents. The resulting value, when added to the graphical results, accounts for losses in a non-ideal conductor.

## Conclusions

The radiation resistance of a horizontal antenna is lowered as the antenna is brought closer to the ground because self and mutual impedances subtract.



**Figure 1**



**Figure 2**



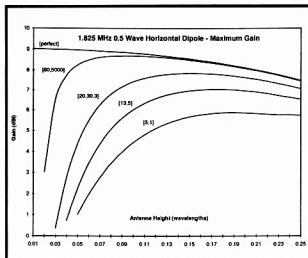


Figure 3

As a horizontal antenna approaches lossy media the feedpoint resistance rises due to increasing power losses in the media. You must be wary of this tendency for low antennas to apparently present a good feedpoint resistance.

Poor conductors, or inappropriate conductor sizes, will also introduce loss resistance. This effect is particularly noticeable in cases such as loading coils. By comparison, though, a horizontal radiator has less ground loss than a vertical antenna mounted at the same average height (compare the graphs for horizontals against those for verticals from Ref 3).

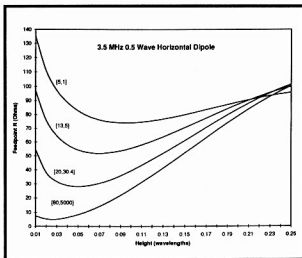


Figure 4

## References

1. Computer program NEC-2, G J Bourke, Lawrence Livermore National Laboratory, 1984.
2. Fields and Waves in Communication Electronics, Simon Ramo, John R Whinnery and Theodore

Van Duzer. Publisher John Wiley and Sons.

3. Short Vertical Antennas and Ground Systems, Ralph Holland, Amateur Radio, October 95.

\*8 Hardy Place, Kambah ACT 2902

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## Technical Editor's Note

This article is entirely theoretical and relies on computer simulations. It is advisable to check such computer simulations against empirical data before committing considerable resources. The computer simulation used is well recognised but caution is always advisable. There have been empirical articles and data on the subject by other authors. Comparison may be worthwhile. The computer simulation can often point to the source of effects noticed empirically, just as the empirical data can validate the assumptions made in the computer simulation.

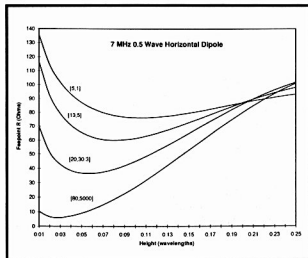


Figure 5

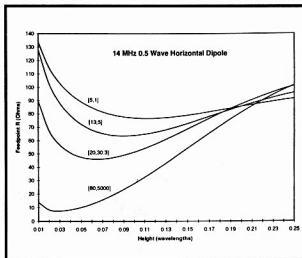


Figure 6

# ALARA

Sally Grattidge VK4SHE\*, ALARA Publicity Officer



The VK5 ALARA 21st Birthday cake.

## Welcome New Members

Elizabeth VK7TLK, sponsored by June VK4SJ; and Fiona VK6 (no call yet).

## Birthday Celebrations

Also on the Birthday net, and not mentioned last time, were Bev VK4NBC and Poppy VK6YF. Christine VK5CTY, who ran the net, almost did not make it as she had been busy all day delivering census material.

## VK5 Lunch

Sixteen members attended the Birthday lunch this year, three of whom travelled more than 50 km to get there, and included two interstate visitors, Dot VK2DDB, and Rae VK8NYL who was visiting her father in Adelaide.

Janet VK5NEI was surprised and delighted to meet up with Rae after many years. They first met in Nauru before either had a radio licence, when Janet was a nursing sister and Rae was one of the young mothers in the maternity clinic. Rae obtained her first licence just before leaving Nauru,

but had to re-sit the exam when she applied for one in P29 land.

Also at the lunch were some of ALARA's early members: Lorraine VK5LM the first VK5 member?, Myrna VK5YW who ran some of the earliest nets, Jenny VK5ANW, and Denise VK5YL who joined soon after ALARA was started by the group of YLs in VK3.

The new VK5 State Representative, Jean VK5TSX, provided a beautiful key-shaped 21st Birthday cake and matching key badges for the occasion. Meg VK5AOV took the uncut portion of the cake to the next VK3 lunch in Melbourne (if you didn't get it girls, she's eaten it!). Mascot VK5GAL (Meg's radio doll) sat at the table, along with the wooden ALARA badge which has represented Joan VK5BYL for so many years as family commitments at this time of year prevent her from attending in person.

Tina VK5ZTC showed her magnetic book marks which were much admired. ALARA Historian Deb VK5DEB tucked into a wicked dessert while those who need longer tape measures looked on in envy. Also present were Sue (XYL of Steve VK5AIM), Joy VK5YJ, Joan (XYL of John VK5EV ex VK5ZRH) representing the Girl Guides, Sue VK5AYL and Christine VK5CTY. Apologies and Birthday greetings came from Jenny Housden (Girl Guides), Joyanne VK5BJH (daughter of Joy), Maria VK5BMT (travelling, of course!), Mary VK5AMD and Beryl Bennet.

## DX

Jackie G7MZI and OM Pete ran a radio

station for a big international scout camp (held every four years) from 31 July to 7 August and were on the air daily on 20 m and 15 m with an FT-990 with homebrew linear to a three element tribander under the callsign GB0WSS. Did any of our members hear them?

## Picnic in the Park

The Townsville YLs got together in August for a picnic lunch in the Palmetum, a particularly picturesque park on the banks of Ross River. BYO lunch took place under a shady tree near a small fountain followed by a stroll through the "rain forest" area of the park (rain provided by sprinklers, this being Townsville). Present were Ann VK4MUM, Sally VK4SHE, Annette, Dawn, Lyndell and Noelene.

The weekly YL net on Wednesdays at 6 pm on the two metre repeater (146.700 MHz) has been well supported in recent weeks. Visiting YLs (escaping the southern chill) are welcome to join in.

## Contest

Don't forget the ALARA Contest in November (details in the *Contests* column). This is a friendly, informal contest with plenty of opportunities to chat. So, if you have never tried a contest before, or are just curious about ALARA, have a listen and make a few contacts.

Novices please try for the Florence McKenzie Trophy as we would love to have a winner to receive it this year. Everyone else, listen for Novice YLs on CW, and offer Novices on SSB a CW contact; in other words, blow the dust off that key and have it ready.

\*Clo PO Woodstock, QLD 4816  
Tel: 077 788 642

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Seen at the VK5 Lunch, (l to r) Sue (XYL of Steve VK5AIM) and Dot VK2DDB.



Also seen at the VK5 Lunch, (l to r) Janet VK5NEI and Rae VK8NYL.

# AMSAT Australia

Bill Magnusson VK3JT\*

## National co-ordinator

Graham Ratcliff VK5AGR

Packet: VK5AGR @VK5WI

## AMSAT Australia net:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7.064 MHz (usually during summer).

Secondary 3.685 MHz (usually during winter).

Frequencies +/- QRM.

## AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia

GPO Box 2141

Adelaide SA 5001

adjustments to accommodate visiting freighters and shuttles and to keep the orbit safe. Hopefully this situation will be a temporary one.

## OSCAR-13 ... We Live in Interesting Times

As James Miller writes in his exhaustive prognosis of the last months of OSCAR-13's life, "Without an atmosphere AO-13 would hit the earth's surface on 1997 Feb 03".

Well, we do have an atmosphere and the perigee of AO-13 is already grazing its upper reaches. As I write this (in August), InstantTrack puts the perigee height at 202 km. Even a brief time each perigee spent hurtling at some 28000 km/hour through the rare upper atmosphere generates heat. Too little to show above the uncertainty threshold in the telemetry yet, but a small amount of energy is dissipated each time and the perigee drops further.

The orbit of AO-13 is oscillating in a quite complex way. The oscillations have a short term 10 day period and a number of longer term periods during which the perigee rises and falls. The perigee has dropped to values of a few hundred km in the past and recovered, but AO-13 cannot recover from this current situation. It will enter the main body of the atmosphere and burn up in early to mid December 1996. Updated reports and refined estimations of the precise re-entry date can be obtained from the various AMSAT internet sites.

The control team have been using this critical but interesting period as a learning exercise to extend limited command and telemetry transmission for as long as possible. One such ploy has been to alter the attitude to allow/at 90/0. This should minimise tumbling and ease the over-heating of the solar panels. It may even extend the transponder usable time although the 2 metre antennas and some other fragile hardware appendages will probably have melted by the first week in December!

What a great bird AO-13 has been. I remember vividly its first operational orbit. We in VK/ZL were fortunate to be in a position to hear it start up. I was listening on 2 metres and heard its beacon turn on for the first time, right on time while I was washing up the evening meal dishes. The psk telemetry was surprisingly loud and clear. I recall the many fine contacts we had into northern Europe and north America and Africa and the regular VK/ZL gang on mode B. I cut my teeth on microwave satellite

operations using AO-13's "S" mode. So did many others. What a thrill it was to hear those weak but perfectly readable signals on the little helix antenna you could hold in one hand.

Well done AO-13 and hurrah for the heroic work of the design, construction, launch and control teams and to the many thousands of amateurs world wide who contributed to the funding of the AO-13 project. A grand job done by all.

Those of us who have been fortunate enough to have taken part in the operations of AO-13 should view the experience with satisfaction and look forward with great anticipation to AO-13's successor, P3D. In the meantime, we can hone our skills on AO-10. Although limited in operation, its orbit is safe from the problems that beset AO-13.

Working with AO-10 is a challenge given its current condition. Only mode "B" is available and only then when the solar panels are fully illuminated. Give it your best shot and it will give you a measure of your station's capability on mode "B".

## JAS-2 Successfully Launched

The JAS-2 spacecraft was successfully launched on 17 August 1996 at 0153 UTC. It has been confirmed that it is in the planned orbit.

Callsign: 8JJCS

Analog mode Output power: 1 W

Uplink passband: 145.900 - 146.000 MHz

Downlink passband: 435.800 - 435.900 MHz

Digital mode 1200bps BFSK

Uplink frequencies: 145.850, 145.870, 145.890, 145.910 MHz

Downlink frequency: 435.910 MHz

9600bps FSK

Uplink frequency: 145.870 MHz

Downlink frequency: 435.910 MHz

Digital: FM voice, max 25 seconds

Downlink frequency: 435.910 MHz, output power 1 W

CW telemetry: Downlink frequency: 435.795 MHz, 12 WPM.

## Full Doppler Tuning

An article on this topic appeared in the March/April 1996 edition of the *AMSAT Journal*. It was written by Ron Parsons W5RKN. It caused me to cast my mind back to my "Beginner" series which was published in Amateur Radio in 1991.

In part 10 of that series I wrote: "Range calculations also have another important spin-off. The rate of change in range with respect to time at the observer's location is a measure of how quickly the satellite is moving towards or away from the observer. This can be resolved into a factor and

## Long Awaited MIR Operations on 70 cm

A message from DL3LUM indicates that the SAFEX II equipment onboard MIR has been activated. This event marks the start of a new era of operations on MIR. All previous operating has been on 2 metres. Over the years there have been many attempts to get MIR up and running on 70 cm but they have all fallen by the wayside.

At the time of writing the SAFEX equipment is operating in the QSO mode connected to the digital speech recorder. You can listen to a short message recorded by the cosmonauts on 437.925 MHz. The other modes have to undergo testing before being activated in the next weeks and months. Please send your reports to DL3LUM. The message can be received with a simple 70 cm hand held transceiver.

DL3LUM may be reached via packet at [DL3LUM@DB0AAB.#BAY.DEU.EU](mailto:DL3LUM@DB0AAB.#BAY.DEU.EU) or e-mail at [joerg.hahn@dlr.de](mailto:joerg.hahn@dlr.de)

My latest reports indicate that MIR is in an unfavourable attitude for the amateur radio antenna system so don't be surprised if signals are a bit weak. Fortunately, MIR undergoes regular orbit and attitude

*applied to the beacon and transponder frequencies to work out of Doppler shift..... Remember, however, that this is only a one way Doppler calculation and is of use only when communicating directly with a satellite. It does not take into account a signal being relayed through an orbiting transponder. This is a much more difficult problem as it involves two different rates of change relative to two separate locations".*

Ron's article touches on this last point and goes on to describe some recently produced software that allows users to invoke full Doppler tuning when in contact via an amateur satellite transponder. According to Ron's article the currently available software, "Nova" for the IBM clones and "McIntosh Master Control" for the Mac OS system will take into account all the problems which, until now, have made working the analog birds difficult, particularly in low orbit VHF/UHF situations. He describes complete contacts made with no manual tuning corrections at all. Maybe someone locally has tried it and can confirm these claims. If it is to work properly it would mean your computer clock would have to be spot-on, your keps right up to date, and the other parties in the QSO would need to be running the same system.

### **New Control Program for the FT-736-R**

Whilst on the subject of computer control of Doppler shift, AMSAT-Australia newsletter no. 135/136 carried a description of a Windows application called FT7361. It can be used to control a Yaesu FT-736-R together with WinOrbit. Two of its stated features are to do with Doppler correction. It is claimed that it can take care of "Full Doppler Tuning" with the analog birds as well as simple Doppler correction on the digital birds.

### **On to Mars**

More information is coming to light regarding the Mars explorer mission and its possible applications for amateur radio operators. The Mars Global Explorer (MGE) is due for launch in November 1996. At a workshop held at Jet Propulsion Laboratory (JPL), Pasadena in June 1996, Professor Michael Owen W9IP, of St Lawrence University, New York discussed various amateur radio activities supporting the Mars Relay Test Flight which is scheduled to take place some 20 days after launch.

The 150 ft Algonquin radio telescope will probably be used but Michael described how more modest systems could do valuable work. Well equipped amateur radio satellite or EME operators will be in a position to take part if their 70 cm tracking antenna has

high gain, right hand circular polarisation and their pre-amp has a very low noise figure.

Your system will **HAVE** to be good. Twenty days after launch the MGE will be 6 million km from Earth. It is estimated that antenna gain required will be >21 dBi. Despite the claims of many antenna designers and manufacturers (and homebrewers), in practice it is easier said than done to exceed 20 dBi gain and there will be few amateur installations that meet this requirement.

On rough calculations, a 70 cm dish with C/P feed would need to be about 6 metres diameter and a crossed Yagi would need to be 24 wavelengths or 16 metres long. The average OSCAR station would fall short of

this unless you go in for a bit of terrestrial DXing as well as the OSCARS. Successful EME stations will be in with a good chance as will successful UHF DXers who can elevate their 70 cm antenna array. Incidentally, don't go looking for "keps" for the MGE. It is NOT in elliptical orbit around the Earth and conventional tracking programs will not work. A special program has been devised to plot its position in az/els terms. Up-to-date information on this program, progress of the project itself, and the ways in which amateurs can participate will be available on the JPL web site on the Internet.

\*RMB 1627, Milawa VIC 3678

CompuServe: 100152.3065

Internet: 100152.3065@compuserve.com

E-mail: vk3jfr@amsat.org

ar

## **WIA News**

### **WIA-SMA Joint Working Group Tackles 80 m DX Window Expansion**

The WIA and the Spectrum Management Agency have formed a working group to look at the WIA's proposal for expansion of the 80 metre DX Window, as a result of discussions at the last WIA-SMA meeting on 28 June.

The joint working group consists of, from the SMA, Peter Allen from the Customer Service Group Technical Projects, Len Bray from the Business Directions Group Spectrum Planning Directions, and Alan Jordan from the Business Directions Group Compliance and Licensing Directions, with Roger Harrison VK2ZRH and David Wardlaw VK3ADW from the WIA.

As the Australian Radiofrequency Spectrum Plan is presently being revised, scheduled for re-issue on 1 January 1997, this represents an opportunity to seek an expanded allocation for Australian amateurs in the 3750-3999 kHz segment of the HF spectrum.

The WIA has proposed that Australian amateurs be permitted to use 3760-3900 kHz on a secondary basis, between the hours of 1700-0830 local time Mondays to Thursdays, and from 1700 on Fridays through 0830 Mondays. In addition, the WIA has proposed that Intermediate

Licensees get access to the expanded DX Window and that 3750-3760 kHz be permitted for amateur emergency service (WICEN) use during notified emergencies, with 3760 kHz lower sideband reserved for non-emergency nets and exercises.

### **UK Exam Fees Rise**

The British regulatory authority, the Radiocommunications Agency, has agreed to a rise in the fees for Morse code tests, according to the Radio Society of Great Britain (RSGB).

From 1 September, said the RSGB News report, Morse code examination fees will be 20 pounds for the 12 words per minute test (that's almost \$40 Australian), while the 5 wpm test will cost 15 pounds, or just under \$30.

While exam costs may be comparatively high in the UK, membership of the RSGB is comparable to WIA membership in Australia. Corporate (or full) membership for those over 18 years of age is 34 pounds, or just on \$67 Australian, Senior Citizen membership for those over state pensionable age is 27 pounds, equivalent to a little over \$53, and the same for Student membership. Junior HamClub membership is 10 pounds, just less than \$20, the same for Family members who reside with existing members.



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## Yaesu FT-2500M 2m Heavy-Duty Mobile Transceiver

Built tough to take the rough stuff. The FT-2500M meets US MIL-SPEC 810C for shock and vibration so it'll provide years of reliable mobile operation. It sports a new easy-to-operate front panel design that has rubber coated knobs to keep the dust out. There is also a huge 'Omni-Glow' LCD screen that is teamed up with a one-piece diecast chassis to set the FT-2500M apart from all other 2m mobiles. For improved front-end performance, Yaesu's exclusive 3-stage Advanced Track Tuning feature and dual-FET mixer reduce overloads from strong signals while providing excellent sensitivity and wide-band receive operation. Cat D-3632



### Also includes:

- 31 tuneable memories
- Inbuilt CTCSS encoder
- 7 selectable tuning steps
- Various scanning modes
- MH-26 hand microphone
- Mobile bracket and DC power lead.

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Whether your interest is in talking through your local repeater, operating SSB DX, or talking to the world via satellite, this high-performance multimode base station transceiver can do it all! In its standard form, the FT-736R provides 25W output on the 2m (144-148MHz) & 70cm (430-450MHz) bands in SSB, CW, and FM modes. Can be expanded to cover the 6m (50-54MHz) & 23cm (1240-1300MHz) bands by installing optional modules.

### Features:

- Digital control with keypad frequency entry
- 100 general-purpose memories
- 10 full-duplex crossband memories, 2 independent VFOs per band
- 2 full-duplex VFOs - transmit & receive frequencies (and modes) can be tuned independently or synchronously for satellite operation
- Adjustable IF Notch and IF Shift filters
- Noise blanker
- All-mode VOX
- 3-speed selectable AGC
- High-stability (+/-1ppm) PLL reference oscillators
- Speech processor and VOX for SSB
- VFO or selectable channel steps on FM
- Digital input connection for packet TNCs
- Efficient switch-mode AC power supply

Cat D-2920

### Specifications:

- Modes: LSB/USB (J3E), CW (A1A), FM (F2D, F3E)  
 Receiver: 50, 144MHz: Dual Conversion  
 Other Bands, Triple Conversion  
 Sensitivity SSB/CW: better than 0.2uV for 12dB S+N/N  
 FM: better than 0.35uV for 12dB SINAD  
 Dimensions: 368 x 129 x 286mm (WHD)



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## Awards

John Kelleher VK3DP - Federal Awards Manager\*

Scanning the bands was once a joyous pastime. Almost daily it could be said that a "new" country had been heard and worked, and subsequently added to your ever growing list of DXCC countries. I personally have graduated to the 300 club, but it has not been easy, and nor will it be as we approach the turn of the century, to add to that listing.

The proliferation of DX nets seems to have fallen away, and only the hardest of souls can be heard playing their wares for the betterment of their ever faithful followers. These, of course, are my own observations. Yours may be entirely different.

In a previous issue of this column, I gave credit for the establishment of the "Down-under County Hunters Net" to some of the wrong people. The founders were indeed Alan VK4AAR, Rex VK3ATZ, and stateside K6RLS, who is personally acting as QSL Manager and liaison in that country. VK5AQZ is attempting to piece together a high-profile VK Award, which we should be hearing about soon.

Don't forget to support your friendly Scout group during JOTA later this month.

I would like to hear from the WA Division of the WIA in regard to West Australian Shires Award, and the West Australian Post Codes Award. Also, I have had queries about the Zone 29 Award. Presented with positive information about these awards, I would have no hesitation in publishing any and all such information received.

This magazine has an international following. This office has received applications for Australian awards following their publication in this column. If there are any clubs or organisations who consider that their presentations have a hint of international flavour, then I would like to hear from them. The following are awards which have been requested by readers:

### The Aruba Award

Contact three members of the Aruba Amateur Radio Club on or after 1 January 1963. GCR list and a fee of \$US1.00 to: Aruba Amateur Radio Club, PO Box San Nicholas, Aruba, Netherlands Antilles.

As usual, I suggest FWWL (work first worry later).

### Worked All Belgian Provinces

Work or hear all nine ON provinces on not more than two amateur bands. No date limits. GCR list and \$US3.00 go to: UBA-HF Award Mgr ON5KL, VanCampenhout

Mat, Hospicestraat 175, B-9080 Moerbeke-Waas, Belgium.

The provinces are: AN Antwerp, BT Brabant, HT Hainaut, LG Liege, LM Limburg, LU Luxembourg, OV East Flanders, NR Namur, and WV West Flanders.

### The Canada Award

Confirm two-way contact with ALL Canadian provinces or territories. Endorsements for any band six to 160 metres, and on mode via Oscar satellite. Modes may be mixed, all CW, SSB, or RTTY. Contacts after 1 July 1977. Send GCR list plus \$US8.00 to: CARF Awards Manager, PO Box 356, Kingston Ontario, Canada K7L 4W2.

Provinces and territories needed are: VO1/VO2 Newfoundland and Labrador, VE1 Prince Edward Island, VE1 Nova Scotia, VE1 New Brunswick, VE2 Quebec, VE3 Ontario, VE4 Manitoba, VE5 Saskatchewan, VE6 Alberta, VE7 British Columbia, VE8 North West Territories, and VY1 Yukon Territory.

### The Germany Award

Commemorating the reunification of the two German states in 1990. Contact at least five stations in each State using at least two bands (80 stations total). All bands and modes. All QSOs after 3 October 1990. Following is the list of States and appropriate DOK prefixes: Baden-Württemberg A, P; Bayern B,C,T,U; Berlin D; Brandenburg Y; Bremen I; Hamburg E; Hessen F; Mecklenburg-Vorpommern V; Niedersachsen H,I; Nordrhein-Westfalen G,L,N,O,R; Rheinland-Pfalz K; Saarland Q; Sachsen S; Sachsen-Anhalt W; Schleswig-Holstein M; and Thüringen X.

Available endorsements are for Mixed, CW, or VHF. GCR list and a fee of DM10, 10 IRCs or \$US7.00 to: Dieter Petring DL1YCA, Bruderstr 52, D-4972 Lohne 2, Germany.

There may be a query on the above four figure postcode. I do not have any information on any changes.

\*PO Box 2175 Camfield Junction 3161

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## Club Corner

### Adelaide Hills Amateur Radio Society (AHARS)

#### Annual Electronics Sale 1996

The club's annual electronic sale is on again. The date this year is Saturday, 23 November and trading will be between the hours of 9.30 am and 2.30 pm. This is the buy and sell event for the year.

As in previous years, the venue is the Westbourne Park Memorial Hall, 390 Goodwood Road, Westbourne Park, about 300 metres south of the Cross Road intersection. All radio amateurs and others interested are invited for a day of trading fun. This is the day to get rid of that surplus gear or to find the odd special component you need. Apart from the trading, it provides an opportunity to have a friendly chat with other amateur radio colleagues. The ALARA ladies will again be there to provide refreshments.

Those interested in selling gear must book table space and this can be arranged by ringing Robert Clogg VK5ZHW on (08) 8370 7411. The doors will be open for

trading at 9.30 am but vendors should present themselves at 8.30 am to prepare their tables. We have to offset the cost of hiring the hall, tables, etc and in previous years we have charged a commission on items sold. This year we have decided to simplify the process by instead charging vendors for each table booked and charging a small entrance fee. The table booking fee is \$10.00 per table for radio amateurs or other non-commercial parties, and \$25.00 per table for commercial organisations. The entrance fee for all parties, including vendors and club members, will be \$1.00. All sales are by negotiation between the buyer and seller and, apart from any gear sold by the club itself, the club will not be involved in the sale.

This is an event you should not miss. We look forward to seeing you there.

**Lloyd Butler VK5BR**  
Vice President AHARS

#### Singapore's Old Timers

On 4 August this year twelve old timers, members of the Singapore Amateur Radio

Transmitting Society who are currently operating as 9V1s, met for a first informal get-together with Chee Phuah Kit 9V1SX the President of SARTS. It was a double celebration. Singapore's 31st National Day was just around the corner (9 August) and they have been amateur radio operators for at least 25 years. For the "quarter century old timers" it was a walk down memory lane and to reminisce about their experiences since the early days of amateur radio activity in Singapore after World War II. Nearly all had served in the Singapore Society with six as President.

**Joseph Seah 9V1NQ**  
63 Lalan Ma'mor #01-59  
Singapore 320063

### Radio Amateurs Old Timers Club (RAOTC)

We are glad to note that membership numbers are quietly but steadily increasing. One thing that puzzles the broadcast group is the smaller than expected number of members and friends that respond to our two 80 metre transmissions, especially now that conditions are so poor on HF at short to medium distances. So, it would be appreciated if more of our members and friends used, or at least reported on, these transmissions at 10.00 am and 8.30 pm.

A suggestion has been made that we consider seeking the use of a repeater to extend the range of our two metre transmission. No action has been taken on this. The committee would be interested to receive comments and suggestions on this matter.

**Allan Doble VK3AMD**

### Mid South Coast Amateur Radio Club Inc

The Mid South Coast Amateur Radio Club, based in the Milton-Ulladulla area of the New South Wales south coast, will be holding its 20th anniversary meeting on Saturday, 2 November 1996 from 10.30 am. Original members, and those who have been associated with the Club in the past, are specially invited to be present.

The meeting place is the "H Ranch", Little Forest Road, Milton. The Club's repeater frequencies of 144.700 and 438.125 MHz will be monitored. For further details please contact Club President Peter Campbell VK2AXJ (QTRH) on (044) 540 727.

**Peter Campbell VK2AXJ**  
President  
ar



**The Singapore Amateur Radio Transmitting Society old timers. The figures in brackets indicate the years licensed as a radio amateur. Seated in the front row, left to right, are Lim Yew Yin 9V1AB (50), N Yatheendran 9V1JY (37), Chee Phuah Kit 9V1SX President of SARTS, Lim Tong Yong 9V1LQ (34), Kok Leng Chong 9V1OF (29), and Ebenezer Lucas 9V1QG (28). In the back row, from left to right, are Frank S C Aw 9V1OK (29), Joseph Seah 9V1NQ (30), David H Rankin 9V1RH (42), Jeffrey Lim 9V1QN (27), Takehisa Sato 9V1UU (32), Ng Soon Kim 9V1RP (25), and Vincent Foong 9V1SA (25). Absent were Dr J Charan Singh 9V1NR (30), Tan Lian Huat 9V1OD (29), and Ong Huck Kin 9V1RA (26).**

# Contests

Peter Nesbitt VK3APN - Federal Contest Coordinator\*

## Contest Calendar Oct - Dec 96

Oct 5/6	VK/ZL/Oceania DX Contest (Phone)	(Aug 96)
Oct 6	RSGB 21/28 MHz Contest (Phone)	(Sep 96)
Oct 12/13	VK/ZL/Oceania DX Contest (CW)	(Aug 96)
Oct 19/20	Worked All Germany Contest (Mixed)	(Sep 96)
Oct 20	RSGB 21/28 MHz Contest (CW)	(Sep 96)
Oct 20	Asia-Pacific Sprint	(Jun 96)
Oct 26/27	CQ-WW DX Contest (Phone)	(Sep 96)
Nov 1/7	HA QRP Contest	
Nov 9	ALARA Contest	
Nov 9/10	WAE RITTY DX Contest	(Jul 96)
Nov 9/10	OK-DX CW Contest	
Nov 16/17	IARU Region 1 160 m Contest	
Nov 23/24	CQ World-Wide DX CW Contest	(Sep 96)
Dec 7/8	ARRL 160 m Contest	
Dec 14/15	ARRL 10 m Contest	
Dec 26 -		
Jan 26	Ross Hull VHF/UHF Contest	
Dec 31	ARRL Straight Key Night	

For information this month, many thanks to VK1PJ, VK2SRM, VK3DMS, G6LX, HA5JJ, and OK2FD. Until next month, good contesting!

73, Peter VK3APN

## Addendum to Results of 1996 John Moyle Field Day Contest

Due to an unfortunate combination of events, last month's results showed an incorrect score, and the wrong winner for the CW section of this contest. Advice has since been received that the winner of the CW section was, in fact, Bill Horner VK4FW who, with a score of 358 points, won the President's Trophy ahead of VK4EMM. Congratulations are extended to Bill for his fine effort!

The John Moyle Contest Manager (Phil Rayner VK1PJ) has also advised that the suggestion for a reduced duration next year was mainly intended to stimulate feedback, plenty of which has since been received. He wishes to thank all those who have contacted him, and advises that as a result of the feedback, the contest duration will definitely *not* be reduced next year, but remain the same. He says to please keep the comments and suggestions flowing, as that is the only way he knows what entrants really want!

## HA-QRP 80 m CW Contest

0000z 1 November to 2400z 7 November

This international contest takes place each year during the first seven days of November, and is open only to stations running a maximum of 10 W input power. Use 3560-3600 kHz, CW only. Call "CQ TEST QRP", and exchange RST, QTH, and names. Score one point per QSO with own

country, and two points per QSO with others. Stations can be contacted only once during the contest for points credit. The final score equals QSO points times DXCC countries worked. Logs must show date, time, call sign, reports, and QTH and name of station worked. Summary sheet must include first name and QTH sent during the contest, Tx input power, and Tx output device. Send logs postmarked by 21 November to: Radiotechnika Szerkesztosege, Budapest, Pf 603, H-1374 Hungary. All entrants will receive participatory certificates, and outstanding scorers will receive a free subscription to Radiotechnika magazine for one year.

## ALARA Contest

Saturday 9 November, 0001-2359z

This Phone/CW contest is open to amateurs and SWLs throughout the world. The object is for YLs to work anyone, whereas OMs and Clubs can work YLs only. Bands are 80-10 m, and the following frequencies are suggested: 3560-3590, 7070-7100, 14250-14280, 21170-21200, 21380-21410, and 28380-28410 kHz. Each station can be contacted twice per band; once on phone, and once on CW. No lists, nets or cross-mode contacts please.

YLs should call "CQ ALARA CONTEST" or "CQ TEST ALARA", and OMs "CQ YL". ALARA members should send RS(T), serial number, ALARA member, and name. YL non-members, OMs and Club stations will send RS(T), serial number, and name. Club stations must identify as a club station each contact, and cannot use personal call signs during club operation.

Score five points for each QSO with an

ALARA member, four points for each QSO with a YL non-member, and three points for each QSO with an OM or Club station. On CW, if either operator is a Novice, score double points. SWLs should score five points per ALARA member logged, and four points per YL non-member logged.

Logs should show date/time UTC, band, mode, call sign worked, RS(T) and serial sent and received, name of operator worked, status of the station worked (YL ALARA, YL non-member, or Club), and points. Attach a cover sheet showing full name, call sign, operator's address, claimed score, and a signed declaration "I hereby certify that I have operated in accordance with the rules and spirit of the contest". Send the log to: "Mrs Marilyn Syme VK3DMS, Box 91, Irymple 3498 VIC, Australia" to be received by 31 December.

Certificates will be awarded for the following: top score overall; top phone only score; top VK YL CW; top VK YL Novice CW (Florence McKenzie certificate); top ALARA member in each country and VK call area; top YL non-member in each continent; top OM in each continent; top SWL in each continent; top VK Novice; top overseas YL CW; and top VK club station. Trophies will be awarded to the top scoring VK YL, and top scoring DX YL.

Logs must be legible (no carbon copies please), and will not be returned. The contest manager's decision will be final, and no correspondence will be entered into.

## OK-DX CW Contest

9/10 November, 1200z Sat to 1200z Sun

This CW contest occurs in the second full weekend in November each year. Bands 160-10 m. Categories are: Single operator, single and multiband; multioperator, single and multi TX; QRP, single and multiband (max 5 W out); and SWL. Single operator stations operate max 20 hours, with min one hour rest periods. Multiband stations apply "10 minute band change rule" (multi Tx stations are exempt from this rule).

Send RST plus serial; OK stations will send RST plus three letter district code. DX (VK) stations score 10 points per OK/OL/OM QSO, and one point per QSO with another country. Multipliers are the sum of DXCC countries and OK districts on each band; final score is QSO points (all bands) times multiplier from all bands.

Note rest periods in the log, and use a separate log for each band. Cross-check sheets are required for 200+ QSOs. Logs can also be submitted in ASCII on DOS disk. Entries should be postmarked by 15 December, and sent to: "CSRK, Box 69, 113 27 Praha 1, Czech Republic".

## IARU Region 1 160 m CW Contest

16/17 November, 1400z Saturday to 0800z Sunday

This contest is a collection of 160 m contests sponsored by several amateur societies in Region 1 (Europe), arranged to coincide on the one weekend. Although mainly intended for QSOs between European stations, non-Europeans are very welcome to enter.

Exchange RST + serial + location code (VK). Score one point per QSO, and multiply by the number of different location codes worked. This

year, send your log to: "ARI Contest Manager Z1UIY, PO Box 14, I-27043 Broni (PV), Italy", postmarked by 31 December.

## Results of 1996 WIA VK Novice Contest

Presented by Ray Milliken VK2SRM

Thirty four contest logs were received this year: twenty eight in Section A (Phone), five in Section B (CW), and one in Section C (SWL).

The Keith Howard VK2AKX Memorial Trophy was won by VK4LDA, the Novice with the highest score in Section A (Phone), and the Clive Burns Memorial Trophy by VK5NOT, the Novice with the highest score in Section B (CW). These are perpetual trophies held on permanent display at the Federal Office and, in each case, the winners will receive an inscribed wall plaque.

### National Winners:

Section A Novice	VK4LDA
Section A AOC	VK2ZL
Section B Novice	VK5NOT
Section B AOC	VK2SPS
Section C SWL	L40018

# = National winners

\*\* = Highest Novice score in each state (excluding national winners)

\* = Special awards

### Individual Scores, Section A (Phone):

VK2ZL (C)#	965
VK3BML (C)*	819
VK4LDA #	761
VK4NBC **	668
VK2AKL *	667
VK5MAP **	645
VK4NWH *	554
VK4MOJ	447
VK3PKY **	407
ZL1BVK	389
VK3KQB	385
VK1CAR (C)	382
VK3PMC	371
VK1KLB **	328
VK6BIK	210
VK3MID	200
VK3MSL	172
VK4LAA	160
VK2ASK	117
VK4KCX	105
VK4NPH **	99
VK4PVH	84
VK3LBA	84
VK3CAM	76
VK2ALS	74
ZL1AGO	59
VK2MGM	48
VK2WO	42
VK3DYF	30

### Individual Scores Section B (CW):

VK5NOT #	80
VK2SPS #	64
VK3NCY **	38
VK3XB	21
VK4XW	7

### Individual Score Section C (SWL):

L40018 #	70
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\*PO Box 2175, Caulfield Junction, VIC 3175  
presbir@melbpc.org.au

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## Divisional Notes

### Forward Bias - VK1 Notes

Peter Parker VK1PK

### Repeater Link Extended to Wollongong

70 centimetre FM contacts between Canberra and Wollongong have become an everyday reality for local amateurs with the completion of the long-awaited Wollongong to Canberra linked repeater system. The system makes use of repeaters at Wollongong, Goulburn and Mount Ginini, allowing contact with much of south-eastern NSW. The link was activated on Saturday, August 17, thanks to the efforts of Rob VK2MT, Simon VK2XQX and Ken VK2TKE of the Illawarra Amateur Radio Society. Stations as far away as Wagga and Sydney can regularly access the link.

The system boasts several novel features, including a facility allowing local amateurs to override the link if they wish to talk locally. As well, a female voice identifier beacons every hour to advise that the link is operating.

There are a few points to bear in mind when using the system. These are: allow two seconds for the links to reset before responding to another station's transmission; hold the PTT button down for a second or so before starting to talk (this is to allow for delays in the link); and, thirdly, don't attempt to talk to the voice ident, you're bound to be disappointed!

In Canberra the link can be accessed through the VK1RGI 70 centimetre repeater operating on 438.375 MHz. The VK1 Division's other UHF repeater, ideal for contacts within the ACT, is located on Black Mountain and transmits on 438.525 MHz.

### VK1ZAO Becomes VK1BBS

After a period operating as VK1ZAO, the packet radio bulletin board serving the Belconnen area has resumed operation under its original VK1BBS callsign.

John VK1ET advises that, if you used VK1ZAO as your home BBS, you should type in the command "NH VK1BBS" to change your user record to reflect the new BBS callsign. All users here are now vk1abc@VK1BBS.ACT.AUS.OC. However, don't panic, mail addressed to the old address of VK1ZAO should still get to you.

John mentions that the NOS box name has changed also. It is now known as VK1BBS-6, with radio ports VK1BBS-1 on 144.800 (4800 baud) and VK1BBS-2 on

147.575 (1200 baud). As well, TCP/IP users should note that the IP addresses have changed to 44.136.1.84 and 44.136.3.84 respectively.

### Triband Beam up for Raffle

Members of the VK1 Division are in the running to win a triband Yagi in a raffle announced at the August general meeting. The wide-spaced beam antenna, made by Chirside, comes with a length of RG213 coaxial cable. Tickets for this raffle will be a dollar each (or six for five dollars), and are being sold at monthly general meetings. The winning ticket will be drawn at the November meeting.

At the August general meeting, members also saw a display of completed VK180 receiver kits and heard a very informative talk from Roger VK2SRH on hard disks and computer viruses.

### JOTA This Month

A reminder that this year's Jamboree of the Air is being held on the weekend of 19 and 20 October. Volunteer operators are still required. If you can spare a couple of hours that weekend, please contact John VK1ET on telephone (06) 254 3140, by packet radio to VK1ET @ VK1BBS, or e-mail to johnwoolner@auslig.gov.au.

### Symposium Update

A presentation on TCP/IP, an introduction to digital signal processing and a talk on empirical receiver design. These are just some of the topics planned for the Canberra Amateur Radio Technical Symposium, being held on Saturday, 23 November. The event's organiser, Mike VK1KCK, reports that other local amateurs have been asked to provide presentations on HF operating, DXing, low-signal VHF work, setting up a packet BBS, weather satellites and constructing HF equipment. Expressions of interest have also been sought from some of Australia's leading amateur radio equipment suppliers to see if they would be interested in setting up a demonstration of their equipment.

Those interested in presenting at the Symposium, or preparing a paper for the proceedings, should contact Mike VK1KCK by phone on (06) 292 0053 or by sending an abstract of their proposed presentation or paper by packet radio to VK1KCK @ VK1KCM.

Further details on the Symposium will be given on the VK1WI broadcast as they come to hand.

## Broadcast Coverage Enhanced

With the extension of the linked repeater network, amateurs in Wollongong and parts of Sydney are now able to listen to the VK1WI news broadcast, on seventy centimetres, thanks to the relay being performed by Phil VK1PC. To hear the bulletin, which goes to air at 8.00 pm each Sunday, tune to 438.225 MHz in Wollongong or Sydney, 438.325 MHz in Goulburn, or 146.950 or 438.375 MHz in Canberra or Wagga. Listeners outside these areas can switch to 3.570 MHz for the 80 metre retransmission by Tex VK1TX.

## Committee Meeting

The Committee of the VK1 Division met on Monday, 12 August at the Mawson Primary School. The following matters were discussed: the appointment of Christopher Davis VK1DO as Public Officer (not to be confused with Publicity Officer); the WIA's submission on amateur licensing in Australia – the committee considered that more emphasis needed to be given to the financial benefits to the SMA of the proposed devolution of call sign issuing to the WIA; name tags for members at meetings; progress on the Canberra Amateur Guide, with it being decided to approach commercial advertisers to offset printing costs; and the Division's financial statements for last year – these were later accepted by members at the August General meeting.

## VK3 Notes

Jim Linton VK3PC

## Memorandum and Articles of Association

The 1996 Annual General Meeting carried a motion recommending that the Directors of the WIA Victorian Division take action to update the Memorandum and Articles.

A draft copy of THE MEMORANDUM AND ARTICLES WILL BE AVAILABLE FOR MEMBERS COMMENT AND INPUT FROM 15 OCTOBER 1996.

Any member may obtain a copy of the document by forwarding a manilla envelope 24 cm x 16 cm, self addressed, with an 85 cent stamp affixed, to the Secretary.

Comments and input will be accepted in writing up until 30 November 1996.

Following further revision of the draft document a Special General Meeting

will be called in accord with Corporations Law, for the purpose of having the new Memorandum and Articles adopted.

## Office Relocation Proposal

A motion carried at the 1996 annual general meeting recommended that Council investigate the desirability and feasibility of relocation of our office near to the central business district of Melbourne. Soon after the AGM several Councillors began working on this project and have provided considerable input.

Council considered a detailed financial evaluation of the proposal by the Treasurer, Rob Hailey VK3NC, together with quotes and estimates obtained by Jerry Viscail VK3MQ. Statistical information obtained from the Victorian Government indicates that the current demographic centre of the population of Victoria is actually Ashburton. It was also noted that, following his own investigation, Councillor Jerry Viscail, who was a signatory to the original motion at the AGM, had reconsidered his position and was not now in favour of such a move.

Council has passed a resolution that, to continue to pursue this matter would be an improper use of valuable time and limited resources, and that the WIA Victoria office will remain at its current location.

## Federal Finances

Council has reviewed the financial performance of the WIA Federal Body, in light of the recently received Balance Sheet for the six months ending 31 June. The Balance Sheet indicates a loss of \$39,869 for the first half of this calendar year. This loss is in addition to the loss of \$17,500 for the year ended December 1995.

The WIA Victoria Council is dismayed and concerned at a loss of this magnitude which may well have repercussions affecting the long term future of WIA Victoria's own financial stability. This situation has arisen in spite of WIA Victoria's warning to the Federal Directors in October and November of 1995, and again in February 1996, when Victoria rejected the proposed 1996 budget which planned for an end-of-year loss of some \$18,000.

Our Federal Councillor, Brenda Edmonds VK3KT, who was present at the WIA Victoria Council which reviewed the Federal finances, was instructed by Council that immediate action be taken in a further attempt to halt the losses. Correspondence received from the Federal Secretary indicates that cost cutting measures are currently being investigated. These include the downsizing and possible relocation of

the Federal office, staff reductions, and the devolvement of some services to the Divisions.

We understand the method of production of *Amateur Radio* magazine is being reviewed, and that the current contract with Bill Roper VK3BR, which expires in November, will not be renewed. The WIA Victoria Council has not, at this time, been provided with full details of the proposed actions. However, we insist that, as Victoria is the largest contributor of funds to Federal coffers, we should be permitted to at least have appropriate input prior to the implementation of any proposed changes.

The WIA Victoria Council is committed to the concept of the WIA federation of states as it now exists. We will do our utmost to provide support for a restructuring of the Federal body and its finances. However, clearly our prime responsibility must be to WIA Victoria members, and the security and stability of our own financial resources.

## Check Your Facts

It is of continuing disappointment that some members are readily prepared to respond on air, or in print, to the rumours or ill-informed comments of others, without verifying the facts. Often these members are apologetic when personally approached after their public actions and advised that they only have half of the story. Sadly, they have been unwittingly conscripted into the rumour mill, and often their reactions are taken as a public endorsement for some political cause or hidden agenda.

If you feel aggrieved after having heard or read something about the WIA, no matter how official sounding its source, please exercise your rights as a responsible WIA Victoria member. Should a matter be of such personal concern that you feel compelled to put out a packet bulletin, write to the editor of a magazine, or vent your beliefs about the topic on air, please wait until you have checked the facts first with the WIA Victoria secretary.

## VK6 Notes

John R Morgan VK6NT

## Divisional GM

The August GM was attended by 23 members. Much business was discussed, including Federal matters, the International HF Beacon Project (the call sign VK6B has been requested), and the general disgust in VK6 at the recently-announced changes to the rules of the John Moyle Field Day contest. Tony VK6TS, the Divisional Broadcast Officer, played a recent recording of the VK4 Division's regular program on

community radio stations in VK4 and P29. The audience's reaction was generally favourable.

The meeting heard of the up-coming 93rd and 90th birthdays of George VK6GM and Fred VK6FH, respectively, and the members present took pleasure in signing a birthday card for each of them.

General Meetings are held on the third Tuesday of each month in the Board Room, 3rd Floor, CWA House, 1174 Hay Street, West Perth, commencing at 8 pm. There is no meeting in December. All interested persons (members and non-members, licensed or listener) are invited to attend, and will be plied with free coffee and biscuits.

## Divisional News

The President, Cliff VK6LZ, wishes it to be known that much of the VK6 Council's time is currently being occupied by important Federal WIA matters, and he urges all members to read the minutes of both the Council and General Meetings. These minutes are promptly published on packet by Don VK6HK.

Peter VK6HAO is the first of the participants in the Division's recent NAOCP Study Class to be heard on-air. Other Novice and Limited Novice callsigns will, no doubt, be appearing soon.

The Divisional Bookshop is now being operated by Roy VK6XV, who may be contacted on Perth (09) 246-3642. A complete list of titles is available on the VK6 Division's new Internet home page.

## WA Repeater Group

The September GM was more like a meeting of the Committee, since only six members attended (Clive VK6CSW, Ralph VK6KRB, Cliff VK6LZ, Will VK6UU, Christine VK6ZLZ, and John VK6NT). When it was discovered that the usual meeting-place was freshly painted, those present were invited to re-locate to the comfort of the nearby QTH of Cliff and Christine. Much WARG business was discussed, including some of the essential field-work to be performed during this summer. As usual, there was despondency expressed concerning the bureaucratic difficulties placed in the way of the implementation of technically innovative repeater systems by both the current SMA regulations, and by the massive inertia of the Federal WIA.

You are invited to take part in the informative and entertaining joint WARG/WIA net, held every Sunday morning, commencing at 10.30 am. Listen for Clive VK6CSW signing VK6RRG on the Lesmurdie repeater (VK6RLM, 146.750 MHz).

Meetings are held at the Scout Hall on the corner of Gibbs Street and Welshpool Road, East Cannington, on the first Monday of every month, starting at about 7.30 pm. The odd-numbered months are General Meetings, and the even-numbered months are Technical Meetings.

## If You Have Material ...

Material for inclusion in this column may be sent to VK6NT @ VK6ZSE.#PER.#WA. AUS.OC, or to PO Box 169, Kalamunda WA 6076, or via telephone on (09) 291-8275.

## "QRM" News from the Tasmanian Division

Robin L Harwood VK7RH

I have been away holidaying in Queensland over August, so I must apologise for a smaller column this month. There has been a change in the office-bearers for the Northern Branch, following the resignations of the President and Secretary at the August meeting. VK7KJC and VK7ZAC also submitted their resignation from the Institute. The office-bearers elected to fill the vacant positions are: President, Bob Richards VK7KRR; Vice-President, Craig Price VK7VEE; Secretary, Robin Harwood VK7RH; and Treasurer, Ian Hart VK7KIH. The positions of Branch WICEN co-ordinator and Equipment Store Officer are also currently vacant.

A proposal to install a six metre FM repeater in Launceston was recently submitted to the Divisional Council by an independent amateur radio group. After discussing this and there being no objection from the Divisional FTAC Officer, the proposal was approved and forwarded to the Spectrum Management Agency. The repeater is not operational at the moment but could be up and running soon.

A new supply of Membership Certificates has now arrived and the backlog will be cleared as soon as possible. If you have recently joined and haven't as yet received your Membership Certificate, please write to the Divisional Membership Officer and we will endeavour to forward one to you as quickly as possible.

Meetings for this month are: Southern Branch, Wednesday, 2 October at 2000 EAST at the Domain Activity Centre; Northwestern Branch, Tuesday, 8 October at 1945 Tasmanian Summer Time at the Penguin High School; and Northern Branch, Wednesday, 9 October at 1930 Tasmanian Summer Time - venue will be advised on the broadcast.

Don't forget that Daylight Saving Time will be in again from 6 October until the end of March. The mainland states that also have Daylight Saving will not be starting until 27 October.

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## Silent Keys

*Due to space demands obituaries should be no longer than 200 words.*

The WIA regrets to announce the recent passing of:-

J H (John)	GORE	VK1PG
P (Peter)	LINDEN	VK3AMX
S (Stan)	PORTWOOD	VK4BZO

### Peter Linden P29CW/VK3AMX

With deep regret I advise of the untimely death of Pete P29CW/VK3AMX. A message from Steve VK3OT said that Pete was killed in a light aircraft crash on Thursday, 22 August whilst on a recreation leave visit to the USA, before returning to VK3 to finish his LAME Course and then return to P29.

He was a talented man and an avid six metre operator, sharing his experiences on that band with readers of *The Internet Six News*. He had so much to offer amateur radio and six metres in Oceania in particular. He was looking forward to Cycle 23 but his life has been snuffed out in his prime.

Our condolences to his family and fellow workers at Moorabbin Airport. It is ironic that Pete lost his life in a light aircraft; that he survived the PNG highlands and the dangerous flights in and out of the mission airstrips, only to lose his life on a local joy flight in the US in a Piper Tripacer.

Vale Pete P29CW/VK3AMX/WA6VDF  
Eric Jamieson VK5LP

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**Tell the advertiser  
you saw it in the  
WIA Amateur  
Radio magazine!**

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# FTAC Notes

John Martin VK3KWA, Chairman, Federal Technical Advisory Committee\*

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## New Records

This month there are new distance records for six bands: 50 MHz, 144 MHz, 1296 MHz (two records), 5.7 GHz, 10 GHz and 24 GHz. Of special note is a new world EME record for 10 GHz, between VK2ALU and G3WGD. Congratulations to all those involved in setting these new records.

## 10 GHz World Record Distance

Also regarding records, there seems to be some confusion over the distance for the 10 GHz world record between VK5NY and VK6KZ. The original distance estimate was 1911 km, but someone somewhere made a typing error which changed it to 1991 km. This incorrect distance has been given in *Dubus* and *QST*, and also made its way into the article by W3EP which was published in August 1996 *Amateur Radio*. Just to set the record straight (!), the distance for this world record has been verified as 1912.1 km.

## Transmission Modes

Since the article on transmission modes was published last February, several questions have been received, all from Novices.

The first is whether Novices can use Pactor on the HF bands. The answer is yes. Novices can use F1 modes (frequency shift keying) on 80 and 10 metres, and this includes RTTY, packet, Pactor, Amtor and so on. These modes may use different shifts, protocols, or data rates, but they are all FSK modes and that is all that matters.

Another question was whether it is legal for Novices to use computer generated Morse. Again yes – the transmitted signal is still CW whether you use a hand key, iambic key, keyboard, or anything else.

There was also a query about Novices making computer generated fax transmissions. The argument was that this would be a digital mode because computers are digital devices, and Novices are allowed to use digital modes. Sorry – it doesn't work that way! The mode is defined by the characteristics of the transmitted signal, no matter how it is generated. SSTV and fax are totally different modes from RTTY or packet, and they are not included in the list of modes available to Novices.

Next question: can Novices work through satellites? The regulations do not say no, so the answer is yes. But the opportunities are limited because the only uplink band available to Novices is 15 metres. I understand that several of the Russian

satellites are operating in mode K (15 metres uplink, 10 metres downlink) at present.

The final question was about the odd frequency limits of the 2 metre Novice digital segment – 144.692 to 145.208 MHz. The reason is to make it legal for Novices to use FM with 16 kHz bandwidth on any carrier frequency between 144.700 and 145.200 MHz. If the band limits were 144.700 – 145.200 MHz, Novices would be legally unable to operate on either 144.700 or 145.200 MHz.

## 40 Metre Band – Digital Modes Segment

Last call! Are there any strong objections to a band plan change to extend this segment? The existing segment is 7030 – 7040 kHz, but some overseas countries cannot be worked below 7040 kHz. The proposal is to change the band plan to recognise the use of 7040 – 7045 kHz for overseas contacts using digital modes.

## 160 Metre Band Plan

The 160 metre CW segment is 1800 – 1810 kHz, less than that in most other countries. It has been suggested that the CW segment should extend up to 1820 kHz.

Also on 160 metres, the band segment 1815 – 1835 kHz is a DX window for overseas contacts, but there is also a lot of local activity around 1825 kHz. It is suggested that the DX window should be kept clear for overseas contacts and that the band plan be changed to include a recommended local "natter frequency" of 1850 kHz.

Any comments would be much appreciated.

## Time for Some House Cleaning

It is time for some action on a problem which is damaging the reputation of the amateur community and could lead to tougher rules which could inconvenience all of us. I am referring to the number of illegal bulletins which are circulating on the packet network.

We hear a lot about freedom of speech lately – especially on the packet network. But "free speech" does not mean that we can say anything we like: it is limited by law. On the amateur bands, we are subject to regulations which place clear limits on the types of messages which we can transmit.

An obvious example is advertising. How many advertisements sneak into the packet network each week? Most of them are automatically suppressed, but others get

through because the originators carefully avoid using words like "Sale" in the title. It makes no difference. Our licence conditions clearly prohibit advertisements, and this includes Wanted, For Sale, Surplus, Disposal or whatever you may like to call them. The only exception is WIA Divisions which have special permission to include classifieds in their broadcasts.

The other area that I feel needs cleaning up is a small number of bulletins with insulting, offensive or filthy language. We need a more stringent system of message filtering to keep this sort of garbage out of the network.

## Interference Problems from Pay TV Set Top Units

There have been several reports of interference problems from pay TV installations. The three systems – cable, satellite and MDS – use quite different set-top units and some give more problems than others. One type of STU generates carriers on multiples of 3.58 MHz or 7.15625 MHz. Another produces wide digital hash which causes serious interference to reception on amateur bands. This unit is also reported to actually cause TVI to free-to-air TV reception!

We need to tackle these problems before they become too widespread, but first we need more information. If you have a pay TV system, or if there is one near you, any reports of interference problems (or the lack of them) would be very much appreciated.

\*PO Box 2175, Caulfield Junction, VIC 3161

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# Technical Correspondence

All technical correspondence from members will be considered for publication, but should be less than 300 words.

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## Kenwood TS-680S HF/6 m Transceivers

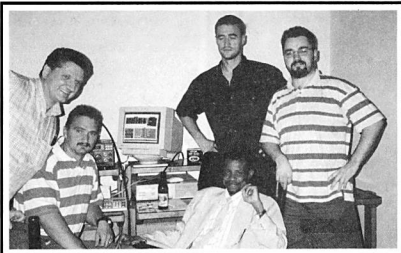
In order to locate the "missing 10 MHz" in the receiver tuning from 35 to 45 MHz, simply use one of the programmable band scan memories as for any band. Enter 35 MHz as the lower limit and 45 MHz as the upper limit and enter into memory. The receiver then tunes 35 to 45 MHz with reasonable sensitivity and the pre-amp is still useful.

John Bisgrove VK4KK  
26 Kennedy Street, Brighton QLD 4017

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## How's DX

Stephen Pall VK2PS\*



**TY8G (l to r) Peter TY1PS, Roger LA4GHA, Bjorn LA9IV, Jonny LA5IIA and (sitting) Mr S Cakpo.**

Do you remember all the "hoo-ha" in August 1994 about a possible new DXCC country called Seborga (*Amateur Radio* September 1994)?

Pierpaolo IIRD and his son Paul IIRBJ were very active with the callsign OS1A from a tiny speck of land north of Ventimiglia which is the railway border town between Italy and France. The contacts were made from an unknown principality called Seborga, which actually is a small township of about 300 inhabitants located about 25 km north-east of Monaco between France and Italy.

It was claimed at that time that the self styled "Principality" was never part of a united Italy which was created around 1860. It was further claimed in amateur cycles, specially by Paul IIRBJ that, for this reason, the possibility of a new "DXCC country" was quite on the cards. Two years have passed without any further significant news.

The other day I read a small news item about Seborga in the *Sydney Morning Herald*. It is partly reproduced here, for no other reason than to amuse you. Never for a moment think that you are reading about the birth of a "new DXCC Country". This is what the news item said in part: "The former Principality of Seborga has proclaimed its independence from Italy."

The self-styled HRH Prince Georgio I, a bearded flower grower and former local tourist board chief, said that he had read a declaration of the Town's independence

during festivities for Seborga's Patron Saint, St Bernard, on Tuesday, 20 August.

Giorgio said the declaration was based on Italian, Vatican and French documents and international law recognising people's rights to self-determination. The only reaction was from the local Interior Ministry representative, who said he hoped it was all harmless folklore, otherwise the state "will have to intervene". But, "Prince Giorgio" protested, "We're appealing to international law. We know what we're doing, we're right in what we are doing, and we're ready to take the consequences."

Well, good luck to them!

### Ashmore Reef - OC-216

Steve AA6LF, who recently operated from Ashmore Reef as VK4ALF/P/VK9, sent me a short note from Kupang City in Timor Indonesia which was his immediate destination after leaving Ashmore Reef. This is what he said: "The conditions were very good. There was a good spot for me to set up my tent and the antenna, except that at night, huge turtles come ashore to breed, and the Park Warden was afraid they would bulldoze everything down! One did take out the radials from the vertical one night, but that was the extent of the damage."

Unfortunately, my operating hours were limited by ANCA's policy that visitors cannot remain on the island after dark, because they would disturb the nesting turtles. Access to the island is difficult at low tide as well, and this was an additional

limitation on operating hours. However, I did manage to make 467 contacts in three afternoons of operation with stations in 43 different countries." QSLs go to his manager, AA6BB.

### Heard Island - VK0

The planned expedition to Heard Island from 12 January 1997 to 28 January 1997, has now reached the final organising stage. A number of guidelines have now been produced dealing with the campsite, equipment, computer networks and logs, food services, medical, power and science facilities, antennas, radios and many other aspects.

There will be two tri-band beams, two WARC beams, three mono-band beams for 15, 20 and 40 metres, four vertical antennas for the 160, 80, and 40 metre bands, 4 Square arrays also for 160, 80, and 40 metres, two vertical arrays for 30 metres, and satellite antennas. All the antennas will be situated at Atlas Cove, the main expedition campsite next to the former ANARE huts.

The equipment was sent ahead in two 20 ft ocean-freight containers to Reunion Island, where the expeditioners will meet in the last week in December, to join the French antarctic vessel "Marion Dufresne" which

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**Peter TY1PS's house in Cotonou where the TY8G group stayed.**

will take them to Heard Island.

The list of equipment seems endless, running into many hundreds of items including portable showers, a portable potty-house and 24 plastic chairs.

There will be five HF CW and SSB stations with three FT-1000MP transceivers and three FT-900 transceivers. There will be five Compaq 410C and two Compaq 400C computers for logging.

A paper logbook associated with each computer will be used to log all operator changes, band changes and mode changes as well as comments about operating conditions, equipment problems, etc. Special attention will be paid to general cleanliness, personal hygiene and to a clean kitchen. Apparently there is some possibility of Fecal-oral contamination. There is a very thick bird guano layer on the island mixed with fine sand. There is also the danger of the "Heard Hustle Gastroenteritis" and a variety of viruses including cold, flu and Hepatitis A. Apparently radios, headsets, computers and hand mikes are excellent sources of infection if used by more than one operator. On Heard Island there will be 20 expeditioners, among them several medical doctors.

Even birds are a personal hazard on the island. The Skua birds are gull-like birds who silently fly up behind their prey and pluck out the eyes to down their prey.

The expeditioners expect plenty of wind on the island, at least twice a week with wind gusts up to 100 mph.

If you can, please assist the expeditions \$US300,000 budget with your donation.

Send your donations to Bob Schmieder, Cordell Expeditions, 4295 Walnut Blvd, Walnut Creek, CA 94596 USA.

### **Benin - TY8G**

Last year, during September, a small group of Norwegian amateurs, Bjorn LA9IY, Roger LA4GHA, Jonny LA5IIA and their host Peter TY1PS activated Benin on all the bands including the WARC bands in the CW, SSB and RTTY mode. A total of 13,076 QSOs were made out of which the Oceania region had 95 contacts. Bill VK4UA was instrumental in keeping the channel free on 20 metres for many VK and ZLs who needed Benin.

The group sent an interesting resume of their activities to Bill who was kind enough to pass the information on to me. In the early days, the area of Benin was divided into several kingdoms. The town Ouidah became the centre of slave trading, encouraged greatly by the Europeans. In 1894 the French merged Abomey, Allada and Porto Novo to form the colony of Dahomey and Dependencies. The colony became independent in 1960 and has undergone dramatic political changes. In 1975 the name of the republic was changed to Benin. The country is also known as the home of the powerful voodoo cult which later spread to other parts of the world. Today Benin is a stable country with a growing economy. Main resources are cotton, palm produce, cocoa, coffee, karitee and peanuts.

The Norwegian amateur group was located in Cotonou (6° 21' N, 2° 26' E) which is the largest city, main port and

commercial centre of the country. They stayed in Peter TY1PS's house, and used his shack and equipment from 16 until 26 September. The operating licence and permission was arranged by Peter and issued by Monsieur Simon Cakpo, Chef Service des Transmissions du Commandement Territorial.

Some interesting statistics of the ten days of DXing. Oceania with 95 contacts produced only 0.7% of the total QSOs but yielded 12 DXCC countries (8.9%); whilst North America produced 27.7% of the total QSOs but only 15 DXCC countries (11.1%). If you still want a QSL, contact Jonny Johannesen, LA5IIA, at PO Box 5626, N-7002 Trondheim, Norway.

### **Future DX Activity**

\* Ben OH3TY will be active from Aland Island, OH0, during the VK-ZL-Oceania CW contest on 12/13 October on all bands. He specially wants contacts on 80 metres around 3510 kHz. He suggests the 1500 to 1800 UTC time-frame for contacts with Australia. He has a Bobtail beam for 7 MHz and two phased Butternut HF2V verticals for 3.5 MHz.

\* Teo EA6BH intends to be active from Cogo, Equatorial Guinea from 16 to 22 October as 3C1DX. Suggested frequencies are 3005, 7005, 14005, 21005, and 28005 kHz. The SSB frequencies are not known at this stage. QSL via EA6BH.

\* Peter ON6TT, who is active in Uganda as 5X1T, will be active again on 80 and 160 metres until December when he will go on leave and join the Heard Island DXpedition.

\* Special event station W4D will be activated on 1 October from the Florida "Walt Disney Magic Kingdom Park" to celebrate the 25th anniversary of the park. Activity will be on CW (40 and 15 metres) and on SSB (80 and 20 metres). QSL via KD4PQT.

\* Sergei R1FJZ made 43,000 QSOs whilst on Franz Josef Land. He is now back on Dikson Island as UA0KBZ. He will be on holiday in September but later he will return to Franz Josef Land, where he will stay until March 1997. He intends to operate also on RTTY.

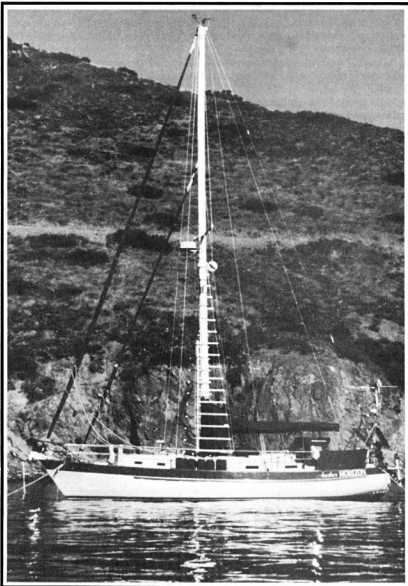
\* Eddie W6/G0AZT will activate the Tunisian call 3V8BB from 8-13 October in the RTTY mode. QSL direct only to Box 5194, Richmond CA 94805, USA.

\* Martin 7P8/G4FUI is active on CW and SSB from Lesotho until December. QSL via home call.

\* There will be another Sable Island DXpedition from 22 to 29 October with the call WA4DAN/CY0.

\* The Egyptian DX net meets Fridays and Saturdays at 1500 UTC on 14220 kHz.





**The yacht "Another Horizon" which carries Steve AA6LF from island to island and around the world.**

\* TT8SP is active in Chad mostly on CW. He was heard on 18070 kHz around 1630 UTC, on 10102 kHz around 2330 UTC, and on the low end of the 20 metres CW segment after 2000 UTC. QSL via F5OJJ.

\* There will be some activity from a variety of French Polynesian Islands with separate IOTA numbers. The Lyon DX Group will be there from 9 to 14 October using the callsign FO0SUC. QSL via Bureau or direct to F5JJW, PO Box 7, 69520, Grigny, France.

\* 3DA0 Swaziland will be activated by Dave WJ2O, Sam ZS6BRZ, and Andre ZS6WPX from 25 to 28 October during the CQ WW DX Contest. QSL via WJ2O.

\* Sergej RW0LBW is active on Falkland Island with the callsign VP8CWL. He will be there until about July 1997. QSL direct to Box 559, Stanley, Falkland Island via UK.

\* PT2NP, PT2GTI and PT2HF will be active for two days during the period from 1 to 14 October from Martin Vax island during a Navy mission to Trindade Island using the marines' helicopter support.

\* Birgitta SM0FIB will move from Angola to Zimbabwe in the middle of September and will try to get an operating licence.

\* Four amateurs, Pete W0AW, Mike N9NS, Joe K8JP and Vincent G0LMY will be active from Nigeria between 22 October

and 3 November on CW, RTTY and satellites. They will take part in the CQ WW SSB Contest as 5N9N. QSL direct only to N2AU.

\* Twenty operators from Germany will sign as YK0B from Syria during the first week in October. QSL via DL8HCZ.

### **Interesting QSOs and QSL Information**

\* 4L1ZG - Zurab - 14014 - CW - 1223 - July (E). QSL to Zurab Gigaure, POB 98, 380004, Tbilisi, Georgia, Asia.

\* 9M6TL - Tony - 14037 - CW - 1310 - July (E). QSL to GOOPB, A J Canning, 261 Loddon Bridge Rd, Woodley, Reading, Berks RG5 4BL, UK.

\* RF300L - 14018 - CW - 1251 - July (E). QSL to RU0LAX via W3HCW Carl F McDaniel, 2116 Reed St, Williamsport, PA-17701, USA.

\* 4L7AA - Mike - 14222 - SSB - 1249 - July (E). QSL to PO Box 32, Warsaw 19, Poland.

\* EY8CQ - Alex - 14016 - CW - 1142 - July (E). QSL to Alex L Rubstov, Box 1102, 734032, Dushanbe, Tajikistan.

\* V63YI/Y - Yui - 14016 - CW - 2301 - Aug (E). QSL via JA3IG, Y Yoshitani, 1-17-29 Oimazato Nishi, Higashinari, Osaka 537 Japan.

\* V63CO - Uwe - 14260 - SSB - 0654 - Aug (E). QSL to DJ9HX via the QSL Bureau.

\* ZK1HW - John - 14022 - CW - 0424 - Aug (E). QSL via 15JHW, Giovanni Bini, Via Santini 30, 51031 Agliana, PT, Italy.

\* ZK1AND - Andy - 14192 - SSB - 0529 - Aug (E). QSL via AB7FS, Andrew N Duncan, 642 Fox Glove St, St E Salem, Oregon 97306, USA (new address).

\* HG8SDS - Tibi - 14216 - SSB - 1342 - Aug (E). QSL via HA8PH, Tibor Horvath, Ady E u 20, H-5530, Veszto, Hungary.

\* B00KS - 14009 - CW - 0724 - July (E). QSL via BV2KI, Bruce Yih, PO Box 84-609, Taipei, Taiwan.

\* 5N6RDH - Dan - 14164 - SSB - 0704 - July (E). QSL via KF9TH, Don W Easterday, 9311 Parent Rd, New Haven, IN-46774, USA.

### **From Here and There and Everywhere**

\* Paul OH5UQ was active in the Pacific area as 3D2PN, A35PM, ZK2PN and ZK1PN. QSL to his home address, Paavo Miettinen, Jukank 4B 16, SF-55100, Imatra, Finland.

\* A number of Americans were active in July from American Samoa and from Western Samoa with the callsigns NH8/N8CC, KH8/K8AQM, KH8/K8GCO, KH8/K8GDS and 5W0BS. All QSLs go via AA8HX.

\* Alan VK8AV, the well known DXer, has moved back to his old QTH in Alice Springs. Alan is a quiet achiever. Very few of his fellow DXers know that he was active in Bahrain in 1956 as MP4BBX and in 1962 he was active as VR4CV. He operated from 4UIITU in Geneva in 1986 and 1987, and from WIAW (ARRL HQ) in 1991. He was active from VK8SEA in 1992 and from 9M0SEA in 1994. He currently holds the calls VK8AV, VK4IV and KB8OSW.

\* Alfredo 9U5CW has said that, due to security precautions and the sensitive political climate in Burundi, he has temporarily suspended his amateur activities.

\* Warren VK0WH from Macquarie Island was quite active during August. He showed up a couple of times on the ANZA Net, on the 40 metre DX net on 7188 kHz and also on the IOTA Net on 14260 kHz. He was also active a couple of times on his 7009 CW spot on 40 metres, and in the middle of August he even turned up one night at 1100 UTC on 1830 kHz on CW and worked a number of VKs and ZLs. Warren is working with three wire beam antennas attached to a 75 ft. tower. The directions of his antennas are Sydney, the USA and the Caribbean. He is now able to switch frequencies but in the same mode only.

\* Jim VK9NS reports that he finally got the copy of the original import certificate regarding Mani VU2JPS's intended transceiver dated 27 February 1996. He also received an official note that his Indian licence (VU2JBS) validity has been extended to 2001. Jim says that the transceiver was sent to Mani VU2JPS in the middle of August with the appropriate monetary transfer which enables Mani to pay the import duty on the transceiver.

\* If you heard X5EBL, the operator was Eddy who was active from Banja Luka, an area called Srpska which is the Serbian part of Bosnia-Herzegovina. Do not rush yet to your DXCC countries list. It is not on! The prefix is a self-styled one and is not recognised by ITU or DXCC. The QSL card via YU1FW has "souvenir" value only.

\* The total population of Crozet and Amsterdam Islands is only 16 scientific personnel.

\* It was reported that Kan JA1BK and Martti OH2BH were in Yangon Myanmar around 23 August in the company of Warren KF7AY. There was no sign of them being on air.

\* Israeli novices use the 4X9 and 4Z9 prefixes with a three letter suffix, and can operate only CW on the 15 and 40 metre bands.

\* Bob KK6EK, the Coordinator of the

Heard Island DXpedition, announced that one member of the team had to withdraw for professional reasons which created a vacancy on the team.

\* The 1997 International DX Convention will be held in Fresno, California from 4 to 6 April.

\* The combined RSGB International HF and International IOTA Convention will be held at the Beaumont Conference Centre (Old Windsor, UK) on 4 to 6 October.

\* Yuki JH1NBN and others (TI5RLI, TI5KD, KI3ERV and 7L2RPY) were on Cocos Island (Pacific) from 26 April to 4 May. In a note sent by Yuki, he mentions that they had some difficulty with landing and camping on Cocos Island. Baggage, which included two rigs, was lost on the onward journey, incorrectly delivered to Brazil by the airline. They managed about 7500 QSOs.

\* Sanyi HA7VK, who spent the last two and a half months in North Korea (see *Amateur Radio* Sept 96) hoping to obtain a licence, has returned to Hungary. He was heard with his home call on Zedan's net on 14250 kHz at 0500 UTC.

\* Propagation has improved slightly. After many months of silence there were occasional long-path openings around 0530 to 0700 UTC to the Middle East and North Africa. At around 1200 UTC there is an occasional opening on short-path to Europe. Of course, both openings refer to the 20 metre band.

## QSLs Received

VQ9DX (3 m AA5DX); ZK2ZE (4 m LA9GY); TI9X (3 m JH1NBN); 5A1A (6 m op Ali); A35MN (3 m DF8AN); ZL8RI (3 m - ZL2HU).

## Thank You

Many thanks to all those who help me with information to put these notes together. Special thanks to VK2XH, VK2KFU, VK2TJF, VK2TQM, VK4UA, LA0370, VK5WO, VK8AV, VK9NS, DF7RX, OH3TY, AA6LF, *The Sydney Morning Herald*, ARRL DXCC Desk, *QRZ DX*, *The DX Bulletin*, *The DX News-Sheet*, *The 425 DX News* and *GOLIST QSL Managers List*.

\*PO Box 93, Dural NSW 2158

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# International Amateur Radio Union Monitoring Service (IARUMS) - Intruder Watch

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Gordon Loveday VK4KAL\*

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## IARU Region 3 Monitoring System

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A timely report by the Region 3 co-ordinator, ZL1CVK, taken from July '96 issue of "Region 3 News".

*Our Region's Monitoring System is part of a world wide network. Its aim is to detect, identify, and remove all unauthorised signals found in the amateur bands. Our bands have been allocated by ITU decree. They are for our use. This fact is completely disregarded by intruders. This is why the IARU monitoring system was instigated.*

*In Region 3 the societies participating in monitoring are JARL, WIA, ARSI and NZART. The monitoring co-ordinator for each society reports each month on the intruders discovered by members of the local society.*

*These monthly reports are sent to the Regional co-ordinator who uses that information, together with information from other sources (in VK a report is sent to the SMA in Canberra) to produce the monthly*

*regional report. A copy of this regional report is sent to each contributing society, Region 3 HQ, Regions 1 and 2 co-ordinators, and to the International Co-ordinator.*

*Steps are taken to contact the source of intrusions with the object of having them removed from our bands.*

*Success in removing intruders is usually quite slow in coming. It is, however, very difficult for any organisation, administration or individual, to refute the enormous amount of data which can be produced by the Monitoring System. This is our strength.*

*There are a large number of regular intruders based in Region 3 and these are our targets. Where possible, the local society of the country where the intruder is based, is asked to assist in the removal. If this is not possible or practical, Region 3 HQ will instigate the complaint process.*

*Following a recent IARU ruling, the above process was used for the first time in March '96. An Iranian broadcast station, Radio Teheran, had been transmitting on 7.070*

MHz for a considerable time. Repeated attempts to get this intruder to move had met with no success. Iran has no amateur organisation, so Region 3 HQ and the monitoring system co-ordinator sent a joint letter of complaint. This was accompanied with the latest world wide reports showing Radio Teheran in our bands.

The Region 3 complaint was one of many sent to the Iranian administration. The combined efforts appear to have paid off. At the time of writing Radio Teheran has not been heard since on 7070 kHz.

Each year, monitoring systems world wide are responsible for effecting the removal of a number of regular intruders. At present we are endeavouring to remove transmissions by the non-amateur Vietnamese CW station VRQ on 14.089-92 kHz, with the able assistance of our IARU Region 3 Correspondent in Vietnam.

Please help us to help you. Encourage your society to become more active in our regional Monitoring System.

It is pleasing to note that the Department of Posts and Telecoms Policy in Vietnam has been charged with creating a completely new set of regulations for amateur radio. The head of the project is Diploma of Engineering Nguyen Ngoc Canh, Deputy Director, who has a favourable attitude towards amateur radio. He and his colleagues have had a draft regulation for amateur radio ready to be presented to the head of the DGPT when some details have been finalised. In the meantime we must be patient.

Back issues of Region 3 News are usually limited, but interested readers who wish to obtain any copy, can write to: The Editor of Region 3 News, PO Box 73, Toshima, Tokyo 170-91, Japan.

## Reports Required

Broadcast stations of particular interest at the time of writing are: 7.035 MHz at 0820z; 7.070 MHz at 0230z possibly with jammer; 7.090 MHz at 0535z; 14.250 MHz Radio Pyongyang, 24 hour operation; 7.098 MHz at 2215z; 7.095 MHz at 2155z; 18.075 MHz at 0410z; 14.240 MHz at 1115z; and 14.330 MHz at 0600z.

A spurious signal has been heard on 14.067 MHz. Transmissions are heard every 30 minutes, last about five minutes and the contents are synthesised voice. If heard, please notify me. The signal originates from Volmet, Sydney, whose legal frequencies include 6676 and 11387 kHz. Please give the make and model of receiver or transceiver used to log this signal.

A signal has been heard on USB on 3614 kHz, English speaking, definitely not amateur, and not Japanese. The signal will

possibly be heard best in our northern areas as the report came from Groote Island.

A new beacon frequency has been noted, "C" on 7040 kHz. Beacon "C" is usually heard on 7039 kHz! Radio Republic of Indonesia continues to be logged on 7098.3 kHz; also Radio Veritas on 7105, spluttering down to 7097 kHz; more reports on these stations would be appreciated.

7070 kHz still remains a popular frequency for intruders; check it out. You may hear some jammers, but please log what you hear!

Also, when checking on the 40 m band, please log any spurious signals above 7100 kHz. The offenders possibly do not know about these intrusions into our legal bands. We can at least advise them in the first instance; if they still persist, the Monitoring Service can get a bit "heavy handed"!

Remember, at all times you should complain to the Monitoring Service about intrusions, not your contact of the moment. Doing that will get you nowhere; with the

Monitoring Service you will have a better chance of success.

## Successes

A few notable removals from our bands include: Radio Pakistan, from 7.080 MHz; Radio Teheran (mentioned previously) from 7.070 MHz; and Adventist World Radio from 7,100 MHz. There are several other intruders using 7,070 at present. Radio Taipei on 14.210 MHz is presumed to have vacated the frequency as it has not been heard for a number of months. The Monitoring Service does not always get notification from the offenders about vacation of frequencies! I have not included those intruders removed from Regions 1 and 2.

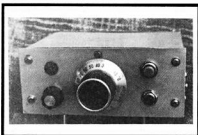
Remember, your complaints, logs, etc should be sent to me as below. My telephone number is 079 854 168 after 9.00 pm.

\*Federal Intruder Watch Co-Ordinator, Freepost No 4 Baysville QLD 4702 or VK4KAL@VKAUN-1

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## Novice Notes

Peter Parker VK1PK\*



**An amateur transmitter need not be complex to be effective. Many contacts throughout VK and ZL have been made with this forty metre, VFO controlled, direct conversion CW transceiver.**

## Basics of Transmitters

### Part One Introduction

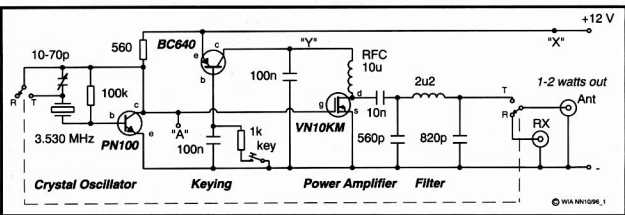
The reason for obtaining an amateur licence is so that one can legally use a transmitter on the amateur bands. This article seeks to give the reader an understanding of the basic transmitter circuits for many of the modes commonly used by the Novice licensee. This month, CW and AM transmitters are discussed. Part Two, to appear in December *Amateur Radio*, will cover DSB, SSB and RTTY transmission. FM will be the subject of a separate article next year.

## CW Transmitters

The simplest of all transmitters are those intended for CW (Morse) operation. In their most basic form, transmitters for CW consist of simply a keyed RF oscillator. Whilst contacts can be had with such an arrangement, most practical designs include at least two stages (an oscillator and a power amplifier).

## A Typical Circuit

Figure 1 shows a design that is popular amongst those who build their own equipment. QRP (low-power) enthusiasts will instantly recognise it as being the "Oner" by George Burt GM3OXX. The first stage is a basic crystal oscillator. A variable capacitor has been wired in series with the crystal to permit a small degree of frequency agility. You will notice that the oscillator has been wired so that it is operating continuously while power is applied to the circuit. The reason for this is that the transmitter circuit came from a design for a transceiver that uses a direct conversion receiver. As direct conversion receivers require a local oscillator signal that is almost the same frequency as the transmitted signal, it makes sense for the transmitter's oscillator to operate during both transmit and receive. The signal for the receiver's mixer is taken (via a low value capacitor) from Point A.



**Fig 1 - Simple crystal controlled CW transmitter.**

The middle transistor is the keying transistor. Note that, being a PNP device, the emitter is connected to the positive rail. As it does not handle RF, almost any audio transistor will suffice, provided it can handle the current drawn from the collector (typically 200 mA). Normally, the collector of the BC640 is at zero volts. However, when the key is pressed, current flows through the transistor, and the collector voltage reaches twelve volts. It is this voltage that powers the transmitter's power amplifier (PA) final stage, and boosts the signal from the few milliwatts generated by the crystal oscillator to a more usable level. Lifting the key will switch off the power amplifier. While the crystal oscillator will still be operating, its low power output and the isolation afforded to it by the dormant PA stage means that no signal will be radiated.

The power amplifier itself is the ultimate in simplicity, consisting of just three components. A VMOS field effect transistor is used for high power gain. The 10  $\mu$ H RF choke supplies power to the FET, whilst preventing RF from being lost to ground through the 100 nF capacitor.

After the final amplifier is a pi-network low pass filter, consisting of the 560 and 820 pF capacitors and the 2.2 microhenry inductor. The function of this circuit is to attenuate harmonics (multiples) of the transmitted signal that will be present on the final amplifier's drain. This is important to prevent interference to television and radio reception.

You will notice the two-pole (or DPDT) switch in the circuit. One part of it switches the antenna between the transmitter and the receiver, while the other actually shifts the frequency of the crystal oscillator slightly. It does this by short-circuiting the variable capacitor in series with the crystal during transmit. When a small capacitor (whether variable or fixed) is wired in series with the

crystal, as in this circuit, the frequency of the oscillator will increase slightly (perhaps 500-1000 Hz with a 3.5 MHz crystal). Shorting the capacitor (by switching to T) will lower the oscillator's frequency during transmit. As direct conversion receivers cannot receive a CW signal when it is exactly the same frequency as the set's internal crystal oscillator, this offset (typically 800 Hz) is required for proper transceive operation.

Note that the foregoing assumes the use of a direct conversion receiver controlled by the transmitter's crystal oscillator. If a stand-alone receiver is being used, the offset function is not required, and can be removed. However, the use of an external receiver requires that the transmitter's oscillator be switched off; otherwise it would spoil reception. This can be achieved by removing power at point X when receiving. Spare contacts on the transmit/receive changeover switch can be used here.

### Other Comments

The above circuit probably represents the simplest practical transmitter for effective HF CW operation. However, additional features can be added to make its operation more enjoyable.

The use of a manually-operated switch for switching between transmit and receive may not appeal to the CW contest operator, or those who operate "break in" (being able to listen to the band in between sending Morse letters). Adding a relay to switch the antenna, frequency offset and receiver automatically

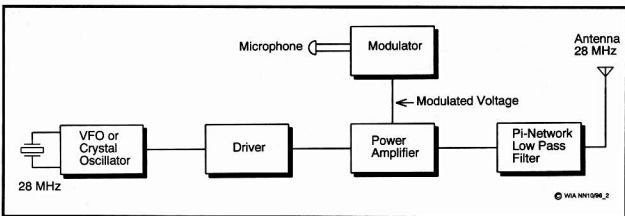
is quite simple, particularly in a circuit such as Figure 1, where there is already a keyed twelve volt line (point Y). In this case, all that needs to be done is to wire the relay's coil between Y and earth, and connect the contacts as per a manual switch. Further refinements, such as receiver muting, side tone, and various time delay circuits make operating smoother still.

Frequency agility is an important feature, and unless one only used the transmitter of Figure 1 to keep regular scheds on a single frequency, one is likely to find crystal control quite limiting. The use of a variable crystal oscillator circuit (known as a VXO) can allow crystals to be moved in frequency slightly. While this is quite practical with fundamental crystals on 21 MHz (where coverage of the entire 25 kHz of the Novice CW band should be possible), it is of limited value on 3.5 MHz, as only small shifts are possible.

Similar to crystals, but capable of a much broader frequency coverage, are ceramic resonators. While less stable than a crystal, ceramic resonators are still sufficiently stable for CW and DSB/SSB transmission and reception. A 3.58 MHz ceramic resonator is capable of covering the entire Australian Novice segment (3.525 - 3.625 MHz), and is less demanding than a conventional VFO in the construction standards and components required.

A free-running variable frequency oscillator (VFO) is also a practical proposition on 80 metres. However, VFO-controlled transmitters need to include

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**Fig 2 - Block diagram of an AM transmitter.**

buffer and voltage regulation circuits, making them more complicated than the "Oner" shown here. Also, VFO transmitters demand a higher standard of construction than do crystal-controlled circuits, with voltage regulation, quality components and solid mechanical construction being vital for frequency stability.

A failure to observe the above precautions will result in the transmitter signal sounding poor on the air. Possibly the most common problem is chirp, which is caused by the frequency of the VFO or crystal oscillator shifting as the key is pressed. A chirpy signal changes its pitch during the time the key is down. This can make the signal difficult to receive, particularly if the receiving station is using a highly selective receiver with a narrow intermediate frequency (IF) or audio filter. Chirp can result from a transmitter with poor VFO voltage regulation or insufficient buffering between the VFO and the succeeding stages. Transmitter circuits where the crystal oscillator or VFO is directly keyed are particularly susceptible to chirp.

Another problem with some designs is key clicks. These are caused when a transmitter's keying pattern (which can be viewed on an oscilloscope) is too abrupt. The use of components in the keying circuit to permit a gradual turn on and turn off (albeit over a fraction of a second) will eliminate clicks, which in severe cases can cause interference to operators on frequencies far removed from the transmitted signal.

### AM Transmitters

Prior to the growth of SSB in the 1960s, and VHF FM operation in the 1970s, the main voice mode used by amateurs was AM. Apart from its use by some WIA Divisions for their Sunday morning broadcasts, AM is only occasionally used by amateurs today.

However, Novice licensees are permitted to use the mode, and there is merit in its continued use, particularly for local communications on 10 metres, where 27 MHz CB radio sets can be converted to amateur operation.

Figure 2 shows a block diagram of an AM transmitter. You will notice that, like the CW transmitter above, it contains a crystal oscillator/VFO, power amplifier stage and pi network low pass filter. Typically, buffer and driver stages will separate the oscillator and the power amplifier, depending on the transmitter's power output.

The distinctive stage in an AM transmitter is the modulator. The modulator is simply an audio amplifier whose output is used to vary (modulate) the supply voltage to the power amplifier. This modulation causes the amplitude (strength) of the transmitted signal to vary in sympathy with the operator's speech.

There are various ways to modulate an AM transmitter. The most effective is called plate (or collector) modulation, because it varies the voltage supplied to the plate (collector) of the final transmitting valve (transistor). This requires a powerful audio amplifier for the modulator, and an associated heavy duty power supply and modulation transformer. Where this is prohibitive, modulation could be applied to either the cathode or screen grid of a valve. However, in this case the depth of modulation is less.

An AM signal contains two identical signals (sidebands) either side of a central carrier signal. Assuming proper audio filtering in the modulator, an AM voice signal should be no more than 6 to 8 kilohertz wide. However, the carrier conveys no intelligence and can be suppressed in the transmitter if it can be replaced by a signal generated locally within the receiver. In

addition, as both sidebands are identical, one can be suppressed to halve the transmitted signal's occupied bandwidth.

I am of course referring to double sideband (DSB) and single sideband (SSB) respectively. Join me in December to learn more about transmitters for those modes.

\*7/1 Garran Place, Garran ACT 2605  
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# Over to You - Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

## Morse Comes of Age

A recent TV news story described how radio Morse is no longer to be used in the RAN, which brought forth yet another chorus of "Morse is dead" from various quarters. And this is added to the earlier report that the US Coastguard no longer officially uses the code ("gee, it MUST be finished world-wide, if the good ol' US Coastguard don't use it no more").

Morse is not dead, nor even ill. That it is "technically" obsolete may or may not be so. It depends greatly on the individual operational circumstances, particularly where costs are involved (for instance, official land-line Morse finished in Australia 30 years ago because machine telegraphy was cheaper, and could be worked by lesser skilled operators). The HF bands, both amateur and commercial, still buzz with the wonderful sound of dots and dashes.

I believe Morse is now entering a new phase, a mature reality, where its continuance is not dependent upon mainly commercial considerations, but rather, will be carried on and used by persons who have a genuine regard and affection for the mode. For instance, how many of us travel to work on horseback? The automobile did not spell the end of equestrian activity. The diesel has not displaced steam in model railway work (steam overwhelmingly has the greater following with model engineers because it lives and breathes and is a pleasure to the senses).

So it is with Morse. Sending it, receiving it, digging out those drifty, fading, chirpy little signals from the other side of the world, listening to old timer's music made upon a bug key, copying "copperplate" sent on a straight key, and basking in the perfection of an electronic keyer are all part of the

challenge and pleasure that an enthusiast may enjoy.

So stop grumbling about the death of Morse. Just get on and USE it!

Drew Diamond VK3XU  
"Nar Meian" 45 Gatters Road  
Wonga Park VIC 3115

## Handbook Availability

I instruct in AOCF Theory for the Southern Peninsula Amateur Radio Club at Rosebud, VIC.

SPARC (as we are known) has, since 1987, been active in the production of amateur radio operators. This year, however, despite a steady influx of candidates for all classes of licence, we find that the handbook for our Full Theory study course is no longer available.

I refer to the *Radio Theory Handbook for Amateur Operators (2nd edition)* by Fred Swainston.

This has been an excellent teaching aid and, without it, next year's students will be severely disadvantaged. If any readers have a copy of this publication for sale, please contact me as below.

In view of the new Question Bank and Regulations being shortly available, I feel that a third edition of Fred Swainston's handbook would be most welcome, not only as a teaching aid but also as an excellent reference source on radio electronics.

Max Morris VK3GMM  
PO Box 222  
Rye VIC 3941

## Polish Appreciation

I would like to express my thanks for the possibility of attending the 2nd IARU Region 3 ARDF Championships in Townsville and for the wonderful hospitality of VK amateurs I met during my stay in Australia. I am

impressed with the excellent organisation of the event, sophisticated choice of the competition courses and the fine work of the VK4 Organising Committee with its Chairman Wally Watkins VK4DO. Also the growing number of VK participants and the high level of their sporting skill is worthwhile to note.

Would you accept my sincere thanks and best regards.

Chris Slomczynski SP5HS  
Chairman  
IARU Region 1 ARDF Working Group  
PO Box 92  
PL 00-967 Warszawa 86  
Poland

## Morse, a Blinkered View

In *Amateur Radio*, February 1996, Steve Ireland VK6VZ wrote that he considered it unacceptable and extremely dangerous to allow amateurs HF operation without the current CW requirement.

Steve talks about amateurs sharing LF bands with professional users. The lowest frequency that Australian amateurs may use is 1800 kHz which is Medium Frequency not Low Frequency. Australian amateurs have no current allocation in the LF band.

Steve also talks about the 80 m SSB DX window. I have heard many warnings on WIA broadcasts about amateurs intruding beyond the edges of this DX window. This segment is only occupied by Full Call amateurs, people that have supposedly passed 10 wpm Morse. It is the understanding and adherence to the amateur radio regulations that stops QRM to professional users, not a knowledge of CW.

The SMA has allowed Limited Operators on HF without the CW requirement. These professionals mustn't think that it is extremely dangerous!

Why must an amateur radio operator learn CW at 10 wpm to talk on HF at 150 wpm?

Is it also totally unacceptable and extremely dangerous for an amateur Limited operator to use HF during times of declared emergency at the request of a combat agency?

I personally have undertaken a communications course with the State Emergency Service and I am also a very active member of WICEN. I am continually training and honing my communicating skills. I have passed Full Call theory and Regulations just the same as people with their AOCF. I have been in bushfires shadowing the Group captain, in amongst the widow makers, providing their only means of communication. Ever since I became an amateur I have participated in JOTA both on packet and on HF SSB (with a Full Call in attendance at all times).

I have received a certificate of appreciation from the Premier of NSW and am constantly

## WIA MORSE PRACTICE TRANSMISSIONS

VK2BW1	Nightly at 2000 local on 3550 kHz
VK2RCW	Continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm
VK3COD	Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz
VK3RCW	Continuous on 145.650 MHz, 5 wpm, 10 wpm
VK4WIT	Monday at 0930 UTC on 3535 kHz
VK4WCH	Wednesday at 1000 UTC on 3535 kHz
VK4AV	Thursday at 0930 UTC on 3535 kHz
VK4WIS	Sunday at 0930 UTC on 3535 kHz
VK5AW1	Nightly at 2030 local on 3550 kHz
VK5RCW	Continuous on 144.975 MHz, 5 wpm to 12 wpm
VK6RCW	Continuous on 147.375 MHz, 4 wpm to 11 wpm
VK6WIA	Nightly at 1930 local on 146.700 MHz and nightly (except Saturday) at 1200 UTC on 3.555 MHz

praised for my operating manner. I have put my skills and my life on the line to help my fellow Australians, yet I still find people, mostly arm chair critics, who say I would be extremely dangerous on HF.

Is someone wearing blinkers?

**Frank Weber VK2XVJ**  
41 Mill Street  
East Maitland NSW 2323

## EMDRC Balloon Launch

Most Amateurs in VK3 would be aware that members of the Eastern and Mountain District radio club are responsible for three balloon launches. Our first consisted of a very basic payload, just a tone generator and 2 m transmitter. For the second one, the payload had a digitised voice and measured altitude, flight time, and internal and external temperature with the mode of transmission being FM and packet. Our latest launch in late 1995 had all the second one had, plus radiation count and battery voltage, and, via a small amplifier, was capable of high or low power as required. Both the first and last payloads were recovered by members of the Melbourne fox-hunting group; the second launch sustained some damage prior to launch and was transmitting only a couple of milliwatts.

My reason for this letter is to alert the amateur community that, during late 1996 and early to mid 1997, we are inviting secondary school science students to take part in a contest for the design and, if possible, construction of an experiment. The school which comes up with the best project will be able to have their experiment launched in November 1997.

We see this as a wonderful opportunity to make the youth of today aware of what amateur radio is all about. We may require interested amateurs that live near some of the schools competing to assist the students and teachers where possible. To give the schools an idea of what to expect, there will be a launch this year on Saturday, 2 November. We expect this payload to reach an altitude of at least 65,000 ft and it should be heard in Adelaide and Sydney. There also is a possibility that the 1996 launch will have a receiver on board so the weak signal operators can test their stations.

There is a web page being created, and it should be operational before this letter is published. For more information regarding this project the club can be contacted by mail to: EMDRC Balloon Launch Committee, PO Box 87, Mitcham 3132 VIC. Or via packet to VK3ER@VK3KSD.

**Jack Bramham VK3WWW**  
EMDRC Inc  
PO Box 87  
Mitcham VIC 3132  
ar

# Pounding Brass

*Stephen P Smith VK2SPS\**

## What to Look for in a Paddle

CW operation to the beginner must be very confusing when you consider the variety of keys and keying equipment currently available on today's market. If you have never used a semi-auto or a single lever before, by all means start with an "Iambic Paddle" and "Keyer". You will have no habits to unlearn, and you will find iambic sending very satisfying and, most importantly, fun to use.

On today's market there are many iambic paddles available to choose from, so choosing the right one can be a very daunting experience especially for the beginner. I would highly recommend that you try several models before outlaying that hard earned cash. Perhaps you could speak to members of your local club about borrowing one for several nights so as to get a feel for iambic sending.

If you can't borrow a paddle and keyer I'll try and steer you in the right direction by giving you some helpful advice and a few general suggestions of what to look for in a good iambic paddle.

## Feel

Try as many models as possible, because the feel of each paddle varies tremendously. Some paddles are stiffer than others, and some feel very sluggish, while others have a very light touch. Correct adjustment and personal experience play an important role in the feel of the paddle. A good paddle should feel very smooth and precise during use; the paddle should never make you feel like you are fighting it.

## Weight

This almost goes without saying, the heavier the better. A paddle that is not heavy enough will slip and slide all over the table during use. If you are a heavy hitter go for a very heavy base. If you have found that perfect paddle and want to purchase it, but feel that it is somewhat under weight, this problem can be easily rectified. You can purchase sheet lead from most hardware and plumbing outlets for a few dollars. Fold it over a few times and glue it to the base of your paddle or you can blue-tack it to the top side of your paddle; this way you can vary the weight for personal preference.

Other methods to use include blue-tacking the paddle to the table or using double side tape. Whichever method you use, it will prevent the paddle from moving during operations.

## Adjustability

Contact spacing and tension (return force) should both be independently adjustable for each side, but sadly this is lacking in some models. Most paddles allow you to adjust contact spacing and tension, but the range of adjustment varies tremendously. The ideal paddle will allow contact spacing to be easily adjusted from almost touching to a gap about 10 mm wide and tension to be adjusted from a very light touch to very heavy with some force being applied to the levers. Every operator has that perfect adjustment for their particular key. One setting you favour might be unsuitable to another operator. Again, experience plays an important role here.

Once the key is adjusted it should hold these adjustments for some time before needing re-adjusting due to normal wear and tear.

A rough guide I use for contact spacing is to use the standard size business card, which is about 2-3 mm thick. Place the card between the contacts until a snug fit is achieved by adjusting the contact spacing screw. You don't want the contacts so close that the slightest knock will activate the keyer into operation. On the other hand, you don't want the contacts too far apart; you need to achieve a medium between these extremes.

Another factor to look out for is how the paddle is to be adjusted, and whether tools are needed or not. Some paddles require medium to small Phillips-head screwdrivers while the Benchmer Model uses a small Allen key which fits underneath the base in a special holder. The Allen key leaves a more permanent setting, especially if you don't want others to touch it. The disadvantage here, though, is that if you are portable and misplace the Allen key no adjustments can be carried out.

The advantage of having a paddle that adjusts without the need for tools, such as using thumbscrews, is you can adjust the key any time, any place. Again, it's up to the individual which way he wants to go. On some of the more expensive overseas models you can get interchangeable levers, with the ability to set the distance between levers and thus custom tailor the key to suit you.

## Connections

Basically, you have two types of connections, "binding posts" and "soldered". Binding posts with thumbscrews

allow you to attach the cable directly to the paddle without the need for soldering. The only disadvantage I can see is losing the cable during transport. On the other hand, soldering the cable ensures it is permanently attached. The disadvantage here is, if the cable develops a fault, the whole lot will have to be replaced. This could be a major problem if you are portable without soldering equipment.

Taking the Bencher Key, for example, the cable is soldered underneath the base. You have three terminals – earth, dot connector and a dash connector. Three core cable is used for connection, but not the 240 VAC type cable.

### Appearance

A good paddle will cost you. I consider it an expensive accessory item to the shack, but one which, if looked after, will outlive the operator. Depending upon personal taste they come in a range of colour, though standard models are usually with black, chrome or gold bases, and with different coloured finger levers, although some operators paint their own levers thereby giving the paddle that personal touch.

### Cost

Cost, like models, varies tremendously, and can range anywhere from \$100 to over \$800 for a custom built paddle from the USA.

### Conclusion

I hope this short article has helped you understand a little more about iambic paddles and that this style of operation can be tremendous fun for anybody willing to give it a go.

### Next Month

A detailed look at the "Bencher Paddle", being the most widely used paddle in Australia; and looking at the history, mechanics and adjustments.

\*PO Box 361, Mona Vale NSW 2103

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## Repeater Link

Will McGhie VK6UU\*

### 10 Metre Gateways

Shortly after e-mailing off the September issue of *Repeater Link*, I received the latest report from FTAC. It contained a small segment on the 10 metre band plan. It said, "Still no response received from TACs, except for a message from Will McGhie to the effect that there is no problem with the band plan provided at least one channel is available for use by simplex repeater gateways".

What is wrong with us? No response from the TACs. Just in case you may not be informed about TACs, read the following information.

### TAC

TAC stands for Technical Advisory Committee. There is a central Federal TAC called FTAC. It is run by one person, John Martin VK3KWA. John operates FTAC on his own, a job that requires considerable effort, and John puts in this effort. Each Division then appoints a representative, who provides input to FTAC on issues raised by Divisional members, Divisional Councils, the Federal WIA, or FTAC itself. These TAC divisions go under various names, all ending in TAC. For example, in VK6 it is called WESTAC.

When an issue is raised, it is FTAC's job to gather comments from as many sources as possible and, in particular, from the Divisional TACs. Once this process has taken place, FTAC then draws up a recommendation for action by the Federal WIA. Largely, the Federal WIA takes on the recommendations and it becomes WIA policy.

### Flaws

I believe that the process has some serious flaws. Strong words, I know, but where the process breaks down in several instances is in the consultation process between FTAC and the Divisions.

An example is the 10 metre gateway proposal. An interesting experimental idea came along. Not everyone's idea of a useful way to spend time on amateur radio but, for some, exciting, and who knows what the idea might develop into. It is very hard to predict the future, as ideas come and go. Some result in great new aspects of amateur radio, while others go nowhere.

The 10 metre gateway is a simplex in-out FM frequency cross linked to an existing repeater. You talk into the 10 metre gateway, to be retransmitted onto a VHF/UHF

repeater, and then listen to the response transmitted back to you on 10 metres, from the VHF/UHF repeater.

The idea was tried and worked very well. It showed all sorts of exciting experimental aspects. The gateways could even be automatically linked to one another, simply by them being on the same frequency on 10 metres. You could, when 10 metre propagation allowed, talk across Australia from local repeater to local repeater.

Then a snag was discovered. 10 metre gateways were not allocated spectrum space on 10 metres and probably contravened several regulations as decided by the SMA. So this line of experimental investigation stopped.

FTAC became involved due to the planning for spectrum on the 10 metre band. FTAC began consultation with those interested in the gateway idea and sought to find space for gateways. Once an initial response was available from FTAC, these ideas were forwarded to the divisional TACs for comment. After several months the only response has been from VK6, and in the initial phase VK5, which had submitted a proposal on gateway band planning. This was done by Grant VK5ZWL.

### Feedback

So where is the feedback from the other Divisions? Several other states either had gateways on air, or in the building phase. These were VK2, VK4 and VK8 to my knowledge. Did the divisional TACs in these states receive the FTAC material? If they did, what happened to it? Did the Divisional Councils see or hear of this information? Did those amateurs who are involved in gateways know of the FTAC material?

This is where I believe the system breaks down. Amateurs are not seeing much of this information so they can provide input. FTAC waits for feedback and time passes by. In the gateway situation two years has now gone by.

### Communications

How can we turn this delay situation around? Communications is the answer. The Divisional TACs need to be in touch with one another. I have a particular interest in gateways and if I could easily contact my TAC counterparts I could encourage comment and hopefully speed up the decision making process.

I hear you say "so what is the problem with communicating with my fellow TACs?"

**Prevent pirates -  
make sure you  
sell your  
transmitter to a  
licensed  
amateur**



The answer is time required and cost. I already spend considerable time on this hobby and don't have the extra time to spend writing letters, or spending money on phone calls. Even if the WIA is prepared to fund my phone calls, and I believe they would, the phone is not the answer. You try contacting several people by phone over a period of time and see how much time you waste. Electronic communications are the way to go. Packet is the best option. It is not perfect but, compared to the present situation, is way in front.

### Packet

FTAC is trying to find out how many TACs are on packet. I did a search on my local BBS's white pages and found only the TAC in VK2 is on packet. There may be others that white pages is not aware of. So how many TACs are on packet? Please let FTAC know, or let me know at *VK6UU @ VK6BBR*. We need to speed up this decision-making process. Two years delay so far on gateways on 10 metres is just not good enough. We have not even begun to tackle the SMA yet over gateways. This means more delay. I will keep you informed as the years mount.

### TAC Representatives

The TAC Representatives for the Divisions are: VK1, Ian Cowan VK1BG; VK2, Geoff McGrorey-Clark VK2EO (on packet); VK3, Peter Mill VK3APO; VK4, Neville Mills VK4DAT; VK5, Garry Herden VK5ZK; and VK6, Will McGhie VK6UU (on packet).

### Internet

In all the years I have been writing articles for *Amateur Radio*, I have never received so many comments from any one article as I have from the article on getting on the net. The article, which appeared separately from *Repeater Link*, struck a nerve with many amateurs getting on the net. Their experiences in many ways mirrored mine. Normally installing the software and hardware for connecting to the Internet is fairly easy, but at times it can be a nightmare. Thanks to all those that contacted me about their experiences.

### Internet Home Pages

Much of my time over the past few months has been involved with learning about how to write home pages for the Internet. It has all been fun and a great learning experience. For those of you with little knowledge of what a home page is, here is my explanation.

Everyone has heard about the Internet and many amateurs are on the Internet. There are

several areas on the Internet; the one in particular that fascinates me at the moment is home pages. When you obtain an Internet account, usually the service provider with whom you have the Internet account, provides space on the server (computer) you are connected to for you to load your home page onto. This space is about three megs of hard disk. You don't have to have a home page, you can just look at other home pages, of which there are millions. This is the Internet in part.

All these servers (computers) are switched on all the time, barring problems. On all these thousands, perhaps a million or more, servers there are perhaps a few hundred users, people who may also have put together a home page. Millions of home pages spread all over the world on many thousands of computers. The Internet is a collective store of all sorts of information, spread all round the world.

Home pages are very colourful, with great graphics, pictures, sounds and video clips; the list goes on. There are limitations and it is all to do with speed. A home page with lots of pictures can take several minutes to display completely. The page starts to load onto your computer with a mixture of text and pictures. While the complete page is downloading there are parts of the page to read and look at, and to scroll up and down. However, at times patience is required. Download speed varies from good to poor, depending largely on the usage of the national and international data links.

When you put up a home page, you become part of this vast resource of knowledge and information. Commercial companies have a considerable presence on the Internet to promote their products and even sell their products or services via the Internet. Your home page is personal to you. What you place on it reflects what you want to present to the rest of the world via the Internet. It could be you had a great holiday, and write up your experience along with pictures of a holiday.

I have been amazed at the vast amount of information. If you want to know something, almost without exception you will find it on the Internet. To give you some amateur radio examples. There is a large amount of information on voice repeaters. Home pages with any number of repeater sites with details on equipment and performance, complete with some great photos of antennas and picturesque locations. Perhaps I will include a few from time to time in *Repeater Link*. The photos are in colour; black and white reproduction in *Amateur Radio* may not do them justice. Other examples are information on duplexers,

repeater controllers and linked repeater systems. The list just goes on and on. Think of it, and chances are there are 10, 100 or 100,000 references to the topic.

### Search Engines

So how do you look this information up? The Internet contains search engines. The jargon of the computer age. A search engine is clever software that runs on a computer somewhere in the world that is connected to the Internet. If you want your home page to be indexed onto a database, so others can find reference to what you have on your home page, you submit your home page Internet location to the search engine. The search engine then looks at your home page and stores key words and phrases into its vast database. Other users then access the search engine and type in a word or a phrase. The search engine then looks through its database and finds matches to the query.

Sometimes the matches are in the 100,000 category. For example I typed in "amateur radio" and found 20,000 references to it! The results are displayed 10 at a time in order of the most likely. For example, if the words "amateur radio" appear right at the start of a home page, or appear several times in a home page, it is more likely to be what you

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are looking for. It is surprising how often you find what you are looking for on the first 10 finds.

## So What?

What has this to do with voice repeaters, I hear you ask? Well, it has kept me away from doing much on the repeater scene for the past few months. In particular, putting together my own home page, and now a home page for the VK6 WIA.

Writing a home page is not that difficult once you learn the basics. They are written using HTML, which stands for Hyper Text Mark up Language. A command text for sending simple information to your computer via the Internet, to tell your computer what colour to make the background screen and where to put the text, what font and colour. Rather than send a screen of red via the Internet, all that is sent is a command like `BACKGROUND =>RED<` and the screen goes red. This equates to it all happening quicker, as there is less data to transfer.

## Text Editor

Now, you can do all this in any text editor provided you know the codes. Not too hard, but not me. There are graphical editors similar to desk top publisher programs that make it much simpler. Lots of point and click. If you want the background to be red you select red and the editor screen goes red. The program writes the HTML code, you don't have to see it at all. It is a what-you-see-you-get type of operation.

## Locations

I have been using Netscape Gold 2 for writing home pages and you can see my efforts on my own home page at: <http://www.faroc.com.au/~will> and the VK6 home page at: <http://www.faroc.com.au/~vk6wia>

## Back on Track

Next month I hope to be back on track with more direct relevance to voice repeaters. I could write much more on the Internet and probably will from time to time, but enough for now. I believe we should be aware of the Internet and particularly how it affects amateur radio. Time will tell, but I

believe there will be good and bad for amateur radio due to the Internet. Many prospective amateurs, and many existing amateurs, could be lost to the Internet.

## Vertical

Over a year ago one of our repeater sites (VK6RTH) was vandalised. The large solar array was smashed by person or persons unknown, reducing the output to about one quarter. The array is 12 metres (40') above ground level mounted on top of a free-standing triangular tower. Weighing in at around 150 kg, removal and replacement of the damaged array presented a daunting, and dangerous job.

The repeater site houses a number of voice and digital systems, most of which had to be shut down due to the reduced solar capacity. A generous donation of two 70 watt solar panels was made to replace the damaged solar array. With the replacement panels available, consideration was given to how to remove the large, heavy, damaged array from atop the tower. The array is all one structure, mounted on the very top apex of the tower. The tower once housed a large wind generator which had been replaced by the solar array many years ago.

Much discussion over several months saw little resolved. Amateur radio has the capacity to chew up vast amounts of time with no progress. It was decided not to remove or replace the damaged solar array, but simply leave it where it was. It was still producing about 2.5 amps, and had been the sole source of power on the site for the past year.

The two new panels were to be placed on the main 32 metre (100') free standing triangular tower, which contained all the site antennas. The two panels would be mounted at the 12 metre (40') level. Now came the process of working out how to install the new panels onto the main tower. Sounds relatively easy, but considerable time rolled on by. These panels are large, measuring some 1.5 metres by 0.75 metres and weighing about 20 kg. The mounting hardware had to be either manufactured or bought. Mounting a panel at the right angle for optimum output on a tapering sloping tower at 12 metres is not easy. Much discussion, including the pricing of the commercial mounting at \$200 each, occupied several meetings over many months. Still the new panels lay idle.

Then some lateral thinking at yet another meeting. Seeing that the output from the new panels was zero as was, perhaps a compromise would see the new panels up and running, albeit at reduced output, a big improvement over the present situation. The idea, mount the panels at the intended

location on the main tower, vertically! That's right, just bolt them to the flat side of the triangular tower, one on the North east side, and the other on the North west side. As luck would have it the triangular tower has one of its legs pointing North. The tower, being triangular, then has two faces pointing in the right directions to receive the morning sun on one face and the afternoon sun on the other. Some simple thinking showed that the morning panel would receive full sun from sunrise, and still be in sunlight right up until about 2 pm. The other panel would receive sunlight from about 10 am until sunset. Further calculations indicated that the overall output would be about 70% of what the output would be if the panels were mounted normally. The big advantage was that it would be simple to mount the panels to the vertical flat side of the tower.

This proved to be true. A metal backing plate, slightly larger than the panels, was attached to each of the solar panels. The extra area of the backing plate that extended beyond the panels was used to mount the panels to the two sides of the tower. All very easy, compared to the difficulty of the conventional mounting arrangement. The reduced solar output, if it became a problem, could be solved by adding another panel. The cost of this panel could be paid for from the money not needed to construct or purchase the mounting frames.

It is interesting to consider how important the angle of a solar panel really is. Considerable effort is spent in mounting the panels at the right angle to optimise their output. However, having played around with solar panels over many years and observed how their outputs vary with different angles to the sun, I have come to the conclusion that it is overstated. Even when the panels are at that exact angle for their location, the sun's rays are only at the true 90 degrees twice a year. The majority of the time the sunlight is at an angle, much of the time a considerable angle. All that complexity and cost may only result in a very small overall output throughout the year.

The vertical panels at our repeater site have now been in operation for a few months through mid-winter. The site, which runs two voice repeaters and a digipeater, has had ample power. To split hairs, the panels are not truly vertical due to the inward slope of the free standing tower, but tilt upwards by about 10 degrees. Perhaps this may be a solution when you next come to mount solar panels. Cut cost and difficulty for the small reduction in output and mount the panels vertically.

\*21 Waterloo Crescent, Lesmurdie 6076  
VK6UUU / VK6BBR

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**Remember to leave  
a three second  
break between  
overs when using a  
repeater**

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# Spotlight on SWLing

Robin L. Harwood VK7RH\*

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As I was compiling this month's column, another crisis broke out in the Gulf, following Iraqi troops re-entering the special exclusion zone in Kurdistan. The Americans have responded to the re-emergence of the Iraqis in the so-called safe haven by launching Cruise missiles in Southern Iraq, targeting specific military air defence command centres there. They have also increased the no-fly zone, virtually crippling what remained of Saddam's air force. You also may remember that Iraqi pilots flew their jets to Iran to get away from the American bombardment in 1991, but the Iranians promptly seized them and last heard these had been incorporated into Teheran's arsenal.

You may recollect that, following the Iraqi defeat and the fear of possible reprisals from Saddam's henchmen, a small safe haven was supervised in northern Iraq under UN supervision in 1992. There the Kurdish refugees were supposed to live peacefully; but, sadly, the Kurds have mainly been fighting amongst themselves and also against the neighbouring states bordering the so-called safe haven, mainly Turkey, Iran and Iraq. The aim is to establish Kurdistan as an independent state from these three nations. This has resulted in the three nations backing various Kurdish factions against each other and an independent state known as Kurdistan does not seem likely to become a reality in the near future.

It appears that many international broadcasters have increased their Arabic broadcasts since the crisis blew up early last month. This isn't very surprising as shortwave is still the primary source of news and information to the majority in the region. Satellite television is only available to the few wealthy individuals able to afford it and it is also primarily in English. Stations in the region are well heard here at 0400z. Teheran is on 15084.3 kHz, mainly in Farsi but other Middle Eastern languages are heard. Saudi Arabia is on 15060 kHz in Turkish, whilst London is on 15235 kHz from their Cyprus relay which is also in Arabic.

Amman, Jordan is on 15290 and is extremely strong here as is Kuwait on 15495 kHz. The Arabic station on 15380 is probably in the United Arab Emirates on the Gulf. 17830 is another channel also from the Emirates but separate from 15380 kHz. Jerusalem was on 17545 at 0400 but it has

since reverted to standard time and is on at 0500z in English.

Iraq is irregularly heard since the US wiped out their facilities in 1991 so don't expect to find them on. Damascus usually is on 15095 kHz, complete with a bad hum on their carrier, yet I haven't heard it during the present crisis.

Another ongoing crisis in the same region is in Chechnya, an autonomous district within the Russian Federation, which has been fighting for its independence from Moscow; there have been heavy casualties on both sides. There have been numerous cease-fires negotiated but they have barely lasted twenty four hours. The capital of Chechnya is Grozny but it is in ruins as a result of the fierce battles for control. There used to be a fairly substantial radio and television centre there but it was completely destroyed. There are reports of clandestine senders backing the Chechen separatist

cause, mainly on FM, but I do expect a shortwave signal will eventually be heard in support of them, probably within the tropical allocation of 60 metres.

The American Catholic broadcaster located in Birmingham, Alabama has been well heard here on 7425 kHz virtually around the clock and now they have added another non-standard allocation. At 0700 I'm hearing WEWN on 6890 in English in parallel to 7425 kHz and even as late as 1000 it is still there. However, a Chinese station becomes more dominant on that allocation after that time.

Daylight Saving commences in Tasmania and New Zealand on 7 October whilst NSW, Victoria and SA commence on 28 October. That date is also when Europe and North America revert to Standard Time and also when most of the frequency alterations will occur. This used to happen at the end of September but a bureaucratic decision by the European Union saw this extended to be in line with the USA. So expect wholesale changes over this weekend.

\*5 Helen Street, Newstead TAS 7250  
VK7RH@VK7BBS.LTN.TAS.AUS.OC  
Internet e-mail: robroy@tassie.net.au

ar

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## VHF/UHF - An Expanding World

Eric Jamieson VK5LP\*

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All times are UTC.

### New Records

John Martin VK3KWA, FTAC Chairman, has advised that a number of new records have been established as follows:

John Bisgrove VK4KK has claimed another extension to his 50 MHz state record, for a contact with GU7DHI on 15 February 1992 at a distance of 16791.3 km.

A contact between Don Graham VK6HK and David Tanner VK3AUU has broken the Western Australian and Victorian two metre records, the distance being 2816.8 km. This contact was made during the extensive tropo opening on 14 February 1996. The previous VK6 to VK3 record was 2784.2 km set in 1980 by VK6KZ and VK3YLR (now VK3KAQ).

There is a new 1296 MHz record for VK7. The previous record of 439.3 km set in 1971 by Kevin Henricks VK7ZAH and Ron Wilkinson VK3AKC (both deceased) was broken by Joe Gelston VK7JG and Trevor Niven VK5NC in March 1988. The new record distance is 674.4 km. No one can accuse Joe and Trevor of being hasty when it comes to making a record claim!

The 23 cm mobile record has been broken again with a contact between Adam Maurer VK3ALM and Brett Sinclair VK3XXX on 25 May 1996 with a distance of 278.4 km.

Russell Lemke VK3ZQB and Alan Devlin VK3XPD have now turned their attention to 5.7 GHz. The result is a new VK3 state record of 95.7 km set on 11 August 1996. Both stations used DB6NT transverters running 300 mW to 60 cm dishes with multi-band feeds.

Walter Howse VK6KZ and Neil Sandford VK6BHT have extended their national 24 GHz record to 86.4 km with a contact between Karrynup and Darling Scarp on 7 July 1996. Both stations used DB6NT transverters and HEMT amplifiers. This contact was reported in full last month.

On 18 August 1996, at 0950, Lyle Patison VK2ALU contacted Charlie Suckling G3WDG on 10 GHz EME over a path of 17,000.4 km which, as far as is known, is a new world record for 10 GHz. Also, this was the first Australia to UK 10 GHz EME contact, the first Australasia to Europe 10 GHz EME contact and the first SHF contact between those areas. On the same day at

1015 Lyle also worked **Petra Suckling G4KGC**, wife of Charlie Suckling. Further details later in these notes.

With the concerted move by a number of VK stations to ever higher frequencies, it is inevitable that distances will be extended, particularly now that narrow-band equipment is the norm. There is little doubt that 10 GHz will receive much attention during the next twelve months and there is every possibility the existing world record distance between **VK5NY** and **VK6KZ** will be exceeded.

## Six Metres

Six metres comes and goes for those who maintain a watch on the band. **John VK4KK** reported a good opening on 18 August from 0200 with contacts from Brisbane to ZL, VK3 and VK7. There were many signals between 50.110 and 50.120 but no VK5s.

**Cliff Betson ZL1MQ** reports: **ZL3s** worked/heard **VK4RGG** and **VK4AFL** on 30/6; **VK3LK** on 9/7; **VK5BC** on 12/7; **VK4KK** and **VK4AR** on 13/7; **VK5AYD** on 16/7; **VK4KPS**, **VK4KK**, **VK4GPS** and **VK4JKL** on 18/7; and **VK3OT** on 30/7.

**VK9YQS** on **Lord Howe Island** worked **VK4s** on 13/7 and **ZL3s** on 14/7. **FK8GM** in **New Caledonia** worked **VK3OT** and **VK5BC** on 13/7 and **ZL3NE1** on 16/7.

**Cliff** advises that **YJ8GM** at **Vanuatu** is now **ZL1GTB** and active on 50 MHz.

**Clarry VK5KL**, of many years standing on six metres, reports that on 15 August the 50.048 **VK8RAS** beacon at **Alice Springs** was 579, on 17/8 579 and 18/8 339. **Clarry** suggests this may indicate an early opening for Es this year.

## Internet Six News

With thanks to the above source by **Geoff GJ4ICD** and forwarded by courtesy of **John VK4FNQ**.

2/7/96: **Jose EH7KW** contacted **KB5IUA** at 8057 kHz for a possible new distance record via Es.

3/7: The Season so far: This depends upon your geographical area is located. If you live "on a line about 40 degrees North" on the globe then you must agree that 1996 is probably the best year for many years for Sporadic "E". We have had 15 USA openings so far this year from mainland Europe to the USA, short skip Es has been down on previous years, but there have been more multi-hop events. Once again, like several years ago, we have seen multi-multi-hops, like 4L6PA to Japan.

UK Cluster users note that your spots/messages are now appearing on the USA Cluster system via Internet! This is a new linking system along with a new

Telnet/Cluster system which links most of the USA and Europe together ... this should be available generally for the 1997 Es season; it is currently on test and provides direct talk facilities in seconds with many of the well known 50 MHz DX operators like **W3IWU**, **W3EP**, **KMIH**, **WA1OUB**, **WA1AYS**, etc. It is proving to be an invaluable tool for the immediate discussions of propagation etc...further details later. [Note: This has been included for readers of AR to indicate the steps being taken in the northern hemisphere to ensure contacts are made ... **VK5LPJ**]

10/7: At 2130JW was worked by **G3FPQ**, **G3WOS** and **G3IBI** on 50.090. The distance is just over 3,000 km from IO91; that makes 171 countries worked from the British Isles in total!

11/7: News from **VK de VK3ALM** and **VK3OT**: In the week ending 5 July winter Es produced signals from the North Island of New Zealand (**ZL2AGI**) and **Lord Howe Island** (**VK9YQS**). **Doug VK9YQS** worked into **VK1**, **VK2** and **VK3** at signal levels up to S9. Times roughly around 0600z - 0700z. **Doug** told me that he is QRT in five weeks and hopefully will be going to the Met station on **Macquarie Island** in 1997. **Doug** was last on **Macquarie** in 1989 and from there he worked into **JA** and **USA**. Equipment will probably be the ever reliable **TS670** and a **Tokyo HiPower 180 W** amp.

**Cliff ZL2AGI** was in on 1 July around 0200z as well as all 45 MHz TV offsets. **Trevor VK4AFL** was heard briefly calling on 50.110.

Beacon information: **VK3RMV** is currently operating on 50.053 MHz CW with the sequence as follows: **Callsign** **Callsign** **QF12ah** **Grid** followed by a carrier for as long as the callsign sequence. Rig runs 12 to 15 watts output and antenna is a **Coman** elevated 3dB co-linear vertical 1/4 wave with 1/2 wave stacked above and phasing harness.

The **VK3SIX** 10 metre beacon has been used to observe meteor scatter, aircraft enhancement and interstate Es and operates on 28.253 MHz CW, 25 watts to five element **Yagi** 38 m above ground. Location is 17 km west of **VK3RMV** in another grid square. **Callsign** **callsign** and **QF02** grid repeated at 5 to 7 wpm. The **VK2RSY** beacon was heard this week on Es 28.262 MHz very loud. **Beacon ZL2MHF** on 28.230 was also heard 559.

**DXpeditions** are planned to **H44**, **YJ8**, **C21**, **T31**, etc for the coming cycle, also to rare grid squares in remote Australia to work into Japan and Europe. **DXpeditions** are planned for **VK9X** Christmas and **VK9C** Cocos Island.

12/7: News from **John VK4FNQ**: Some Es today: 0120 heard **ZL3NE** calling **CQ** 50.110 5/5. 0151 worked **VK4APG** 5x9. 0355 **VK8VF** beacon 419 for about 10 minutes. 0358 worked **VK4SIX** 5x9. 0450 **VK8RAS** beacon 519. 0511 worked **VK4TZL** 5x9. 0550 worked **VK4AFL** 5x5. 0555 **VK8RAS** beacon 599. 0610 **VK8RAS** beacon 599. 0738 **VK4AFL** calling **CQ** 50.110 5x2.

14/7: In **Townsville** at 0320 **VK4BKM** worked **FK8GM** and reported hearing **VK3GJQ**, **VK2EMA**, **VK2APG**, **VK5BC** and heard **ZL** television.

14/7: **USA** to **JA** de **JA1VOK**: **KL7NO** (**BP54**) was worked as the first North American this season on 50.110 CW/SSB by **JA7QVI** (**QM08**) at 0721, **JH2COZ** (**PM94**) at 0727 and myself (**QM05**) at 0729. The signal was 5x5 to 5x9 with QSB here, but the opening lasted only for 10 minutes.

14/7: During a QSO with **Costas SV1DH**, he informed me that he had heard **KP4** in early July, the distance is about 8900 km.

16/7: Good Europe to Europe opening with 25 countries worked, best DX was 4X1IF, **SV9**, **SV5**, **Z3**, and the **VO1ZA** beacon was in and out for three hours, also worked **WA1OUB** on CW/phone ... de **GJ4ICD**

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207Z: This season 76 countries have been worked in Europe on 50 MHz. Although nobody has worked them all, it shows that the activity has been there despite some countries not being active, like HV, 4U1, CU, D4, JY, OD, OJ0, TF, S0 and OX. Add those to the score that were worked in 1994/5 and the total would be in the mid 80s! Pretty good for Sporadic E only contacts! So the question is, "Could DXCC ever be achieved via Sporadic E?"

2717: 1995/6 Es Season: Thanks to all (over 100 so far) who have sent information about the season. All comments have been noted and a general summary will be made later; thanks for also reminding us about the Dec/Jan/Feb openings on 144 MHz. One very interesting comment from Alan EA7BA was that conditions are better at solar minimum the closer you are to the equator ... yes, that has been said by many. The poll so far indicates that, including the end of last year, things are better than the cycle peak, but only just by 64 to 54. The general comment of southerly latitude has been repeated several times ... the fantastic 144 MHz openings in the USA in December were pointed out by over 20 ops ... from Finland came the report of the 144 MHz opening in February, but so far there is no feedback from VK/ZLZS.

[The problem with obtaining adequate feedback about Es in VK is that it is viewed by many operators as a "ho-hum" experience; it has been an annual occurrence for fifty years, with VK to VK contacts the norm. There is little six metre activity in P29, an occasional contact to FK8, the overall Es monotony for many being broken only by the readily available ZLs.

To live in the UK or central Europe and work Es must be an experience VKs can only dream about - 76 countries overall for their summer Es, 25 to 30 countries in one day, hordes of exchanges "across the pond" to the US, Canada, the Caribbean and points between. The mind boggles! Their antenna rotators must never become cold! It's all so new to Europe, but they are making the most of it and are to be commended for doing so. I would be living the same if I lived there! VK5LPJ]

267Z: Opening #26 to USA last night when VE9AA was copied in G and GJ. G3FPQ worked Mike at 2054, VE1PZ was also worked in the UK.

## Fax

A mystery fax arrived on my desk dated 17 August 1996. The single page has no indent, other than to say it is page 1 of 11, headed GB2RS News - the weekly news service of RSGB which is broadcast to radio

amateurs. At the bottom of the page an arrow points to a notice that, "as part of an experiment by the RSGB Propagation Studies Committee, Chris Deacon G4IFX, of Darlington, County Durham, has been granted permission by the RA to use the callsign GB3IFX for his 50 MHz tropospheric tests. The beacon transmits on 50.275 MHz, on the hour, every hour, in 30 second bursts during which the callsign and time are sent twice."

I include the above as an indication that something arrived but I may be missing further sheets or information.

## UK News

Ted Collins G4UPS had a reasonable July by working the following 40 countries: 5B4, 9H, CT, DL, EH, EH8, EH9, ES, EU, F1, GM, GW, HA, HB9, HV, I, IS0, IT9, JP1, JX7, KP4, LA, OE, OH, OK, PA, RS1, S57, SM7, SP9, SV1, SV5, TF3, UX, V47, VE, W, YO, YU and ZB2. In addition, 20 beacons were heard.

The following is a log extract from G4UPS for a reasonable day, but one without an opening to W, VE or KP; they were available on several other days!

16 July 1996: 0630 10 m/6 m closed; 0700 29 MHz OK0/DL0/EA3 bcns; 0715 SP2NJE 5x9... 0717 inband TV Europe starts strong... 0718 S57AC 5x5... 4N1SIX bcen 579... OE6BMG 559... ES6SIX bcen 559... OE6LOG 5x9... SR5SIX bcen 599... 0748 SM7AED 569... 0752 G3CCH 559... much QRM from inband TV... SP6HEJ 599... ES0SIX bcen 559... ES111/8 5x7... S52MQ 579... G/PE1PZS 559.

0839 SV5TS 599 Rhodes... 0841 SP5XMU 5x9... SV1SIX bcen 559... I2OKW 5x9... HV3SJ 599... 0910 SV9SIX bcen 559... IK0BAL 5x9... SP9EWU 599... IK8DYD 5x9... SP6LB 5x9... SP6NVN 5x9... SP1PPG 5x9... I2TQ 599... 0933 SP2SGZ 5x9... SR6SIX bcen 599... ISRRZ 5x9... 0947 IK5RLP 5x9... 1000 only HV3SJ bcen/ stations audible. Pop swings north... 1015 SM3EQY 5x8... 1020 OK2BGW 5x9... 1036 OM3CM 579... then SSB 5x6.

1040 HA6ZB 5x9... 1046 G7WAX 599... strong inband TV again... EH3CUU bcen 599... 1100 fade out. 1125 HA6ZB on 28 MHz... 1128 inband TV strong... SR5SIX bcen

579... 1215 EH7KF 5x9... HV3SJ bcen 579... several weak 1 stations... 1315 1 stations... S55ZRS bcen 599... 4N1SIX bcen 599... S57AC 5x9... S51MQ 5x9... YT1AU 559... IK3/OE2UKLp 5x9... YU1ABA 559... OEM6HS 5x9... 1422 OE1PMC/8 5x9... 9A7V 5x9... very little activity... S53VV 599... 9A3FT 599.

1501 S51UJ 599... OE6TAG 5x9... 17UNU 5x9... 1550 all faded out except EH3CUU bcen. 1558 CTOWW bcen 599... 1559 EH7KW 599... no further activity until 1645 EH1KV 5x9... inband TV starts... S59D 5x9... CT1DXY 5x9... SP6TRQ 5x9... 4N1SIX bcen 599... 1656 10CMD 5x9... HV3SJ bcen 599... 1711 OK2PPP 5x7... 1712 YO2IS 5x9... 1737 YZ1SM 5x9... 1747 10JX 599... 4X11F 559... 1752 F5LHI 599... 14XCC 599... 1806 YL3AG 579... 1811 EH8ACW 5x9.

1816 9A5Yp 5x9 small island off coast... 1830 1 stations... ES5DE 559... 1830 SV1SIX/SV9SIX bcns 579... 1908 IK4MBN 5x7... 1920 heard SV1DH... 1945 only a few weak 1 stations - all faded out at 2015.

In addition to the above information, Ted also records the operator's name and grid square of each station! I wonder what Ted does in his spare time?

## 10 GHz EME

I seem to have run out of space so will leave a description of the record contacts by Lyle VK2ALU (mentioned earlier) until next month, rather than edit them too heavily.

## Closure

Be aware when reading these columns that we are in the equinox and this offers possibilities for extended six metre contacts. Don't ignore the European path and listen for those 45 MHz video carriers, they may be from a greater distance than Asia.

Closing with two thoughts for the month: 1. Honesty is stronger medicine than sympathy, which may console but often conceals, and

2. To love and be loved is to feel the sun from both sides.

73 from The Voice by the Lake.

\*PO Box 169, Meningie SA 5264

Fax: (085) 751 043

Pucker: VK5LPJ@VK5WI.#DL.#SA.#AUS.OC

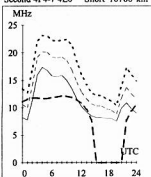
ar

Have you advised the WIA Federal Office of your new callsign? Use the form on the reverse of the Amateur Radio address flysheet

**Adelaide-Lusakar**

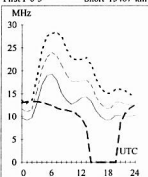
246

Second 4F4-7 4E0 Short 10788 km

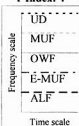
**Brisbane-Budapest**

312

First F 0-5 Short 15467 km

**HF PREDICTIONS**

Evan Jarman VK3ANI

**T Index: 4**

These graphs show the predicted diurnal variation in key frequencies for the nominated circuits. They also indicate a possibility of communication (percentage).

The frequencies identified in the legend are:-

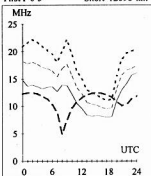
- Upper Decile (10%)
- Maximum Usable Frequency (50%)
- E layer MUF
- Optimum Working Frequency (90%)
- Absorption Limiting Frequency

The predictions were made by one of the Ionospheric Prediction Service Stand Alone Prediction Systems. The T index used is shown above the legend. The Australian terminal azimuth (degrees), path length (kilometres) and propagation modes are also given for each circuit. ar

**Adelaide-Montevideo**

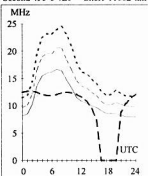
167

First F 0-5 Short 12098 km

**Brisbane-Capetown**

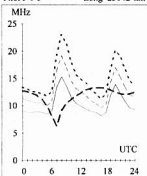
218

Second 4F3-6 4E0 Short 11682 km

**Canberra-London**

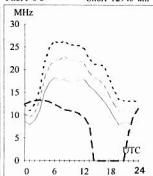
136

First F 0-5 Long 23042 km

**Darwin-Berlin**

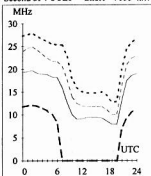
323

First F 0-5 Short 12945 km

**Adelaide-Tokyo**

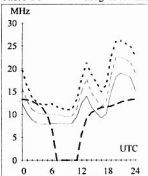
1

Second 3F4-8 3E0 Short 7855 km

**Brisbane-Montreal**

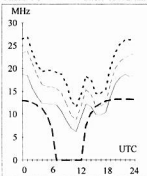
51

First F 0-5 Long 15469 km

**Canberra-Mexico City**

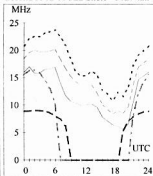
85

First F 0-5 Short 13092 km

**Darwin-Suva**

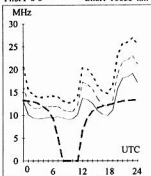
103

Second 3F12-16 3E2 Short 5127 km

**Adelaide-Washington**

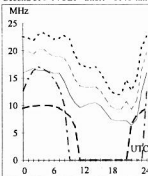
71

First F 0-5 Short 16833 km

**Brisbane-Singapore**

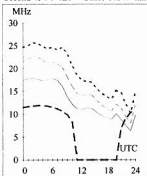
293

Second 3F9-14 3E0 Short 6146 km

**Canberra-New Delhi**

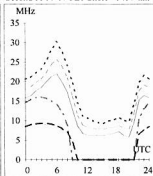
303

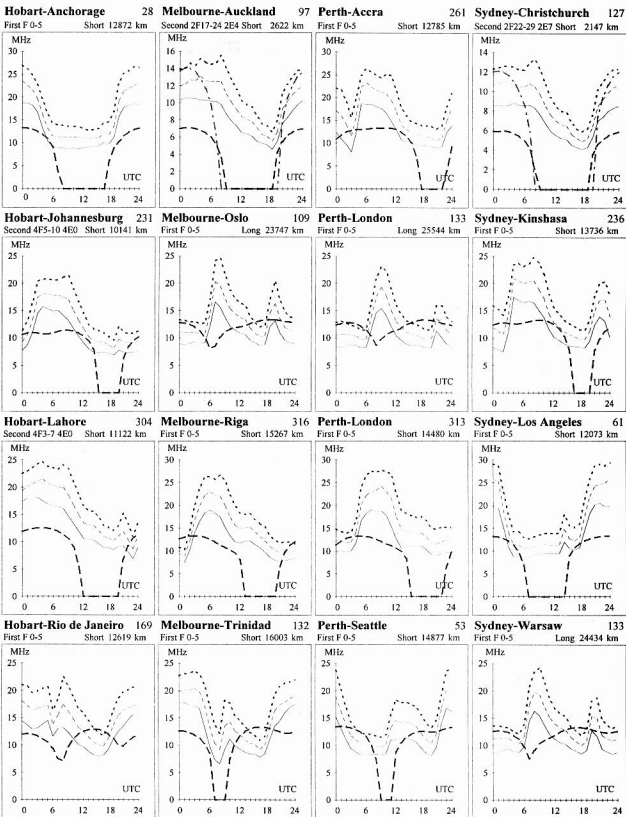
Second 4F4-9 4E0 Short 10349 km

**Darwin-Tokyo**

10

Second 3F10-17 3E1 Short 5437 km





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Deceased Estate of Tas McLoughlin VK2GV. Icom IC-735 HF transceiver s/n 15879, \$1,000; Kenwood TS-120V HF transceiver s/n 921541, \$400; Kenpro KR-800S antenna rotator s/n MC8050, \$500; Yaesu FT-211RH 2 metre FM transceiver s/n 7L110085, \$300; Daiwa CNW418 antenna tuner s/n D07183, \$150;

Power Mate PSU, \$150; Electronic keyer, assembled kit, \$30. All of the items on offer are available at the home of VK2GV in Scone, NSW. A range of assorted radio related equipment is available for purchase at the same source. Please contact Les VK2RJ at QTHR or on telephone (065) 43 1942; or Mr Gerrard McLoughlin on (065) 45 2499 to arrange inspection and purchase.

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Kenwood TS520 transceiver, s/n 231004, c/w AC/DC cables, desk mic, hand mic, manual, gc, \$425. Stewart VK3NV (059) 87 3592.

Hallcrafters S27 UHF RX, fully operational now after resurrection, with spare tubes and book, \$180; Command RX 6-9.1 MHz original but W/O dynamotor, \$120; Icom AH-2 automatic tuner and controller suitable for IC-735 transceiver, \$250. VK3IZ (051) 56 2053, 22 Hugh St, Metung Vic 3904.

Hy-gain 204BA 4 el beam, \$150; Nally tower, 2 sections, tilt over, \$250; Autoplex plated bug keyer, \$100; Solid brass Morse key, \$35; Daiwa coax switch, four outlet, cost \$130, sell \$60; Daiwa power meter, \$65. Ken VK3TL, Montrose, (03) 9728 5350.

Shack Cleanout. Icom IC575H xcvr, 6 m/10 m (front panel slightly damaged, but works perfectly), \$1,400; Icom IC720A HF xcvr, \$550; Icom IC47A 70 cm FM xcvr, \$300; Icom IC25H 2 m 45 W FM xcvr, \$350; Philips FM321 70 cm xcvr, \$150; Yaesu FT101 has been modded, \$250; Kantronics KPC3 TNC with software, \$175; Yaesu FT290R together with Mutek SL4NA 1455b low noise front end (not fitted), \$450. Mike Goode VK3BDL (03) 9589 5799. Licensed amateurs only.

Kenwood TS930S HF tcvr, mic, manual, original carton, \$1,400; Cushcraft R7 multiband HF vertical ant, 10 m to 40 m, brand new, \$600. Ray VK3RD (03) 9726 9222.

Yaesu original 101 to 101E maintenance service manual with mods plus schematics from

Yaesu in English, used once only, best offer; Yaesu FV101 VFO, \$125 plus postage. Jim VK3YJ QTHR (03) 9315 9387.

Icom IC275H s/n 02240 2 m all mode, 100 W transceiver with built in BF981 preamp, \$1,650; Icom IC475H s/n 01378 70 cm all mode, 75 W transceiver with Mirage KP2/70 cm GaAs-FET masthead preamp, \$1,950; Icom CT-18 s/n 0512, satellite interface free if you buy the pair, or \$80; Icom ICPS15 s/n 30003411, 13.8 V 20 A supply, \$275; Kenwood TS690S/AT s/n 30300828, HF all band 100 W, 6 m 50 W transceiver with CW filter and b/i ATU, supplied with Kenwood MC-60A s/n 176 desk mic, \$1,800. All items are as new and supplied with all packaging, books and leads/microphones. I can deliver to the Melbourne CBD if required. Bert VK3TU (052) 78 2374 or mobile (0412) 25 1810.

## FOR SALE QLD

Cushcraft R7 vertical antenna, good condition, \$725 ono. Ted VK4DBL (074) 91 2034.

Reception set No 109 WWII receiver 1.8 to 8.5 MHz, working order. Offers to Graham Bennett VK4FGB, Box 1914, Cairns Qld 4870.

## FOR SALE SA

Teletype model 15 in reasonable condition, 5 cartons of original spares, original handbooks and adjustment instructions ex PMG, \$100; Used 4-1000A tubes (4 of), \$40 the lot. Rod VK5UW (08) 8382 3352.

RF Connectors, microphones, mic cords, antenna bases, CRO probes, 10-11 m 5 el beam, log periodic (8 el), 2x100 watt baluns, Vectorronics ATU 1.8-30 MHz, top shelf ATU, and more. Send SASE for list. Paul VK5MAP QTHR (086) 51 2398.

## FOR SALE TAS

Yaesu FT1747GX 160-10 m inc gen coverage receive, CW/AM SSB filters, mint cond, boxes, manuals, \$860; Icom FL102 AM filter suit IC760 IC761 IC765 IC575 new, \$65. Allen VK7AN (03) 6327 1171.

## WANTED NSW

Photocopies technical data for valves 6BM8 QQCO4/15 (locktal base) and JRC955 (Acorn valve), also handbook (or photocopies) manual for AVO CT160 valve tester, will pay reasonable costs. Pat VK2ABE (067) 68 1470, Box 522, Glen Innes NSW 2370.



## WANTED VIC

Schematic/book for AWA base station, vintage 1962 model 2J56760 VHF. Would consider sale to best offer. Fully operational inc stand-by vibrator PSU, uses QQEO640 in final. VK3IZ (051) 56 2053, 22 Hugh St, Metung Vic 3904.

Kyoritsu multimeter KEW6610, any condition, need bridge rectifier for AC range, one diode blown under power surge. Bill VK3WG (03) 9592 8732.

## WANTED SA

Urgent, Operators manual for Kenwood TS-120S or photocopy. Will pay all costs. Paul VK5MAP QTHR (086) 51 2398.

## WANTED TAS

Hatfield RF Bridge LE300A instruction manual or any info please. Bryan VK7ZBE QTHR (004) 24 3685.

### MISCELLANEOUS

• THE WIA QSL Collection (now Federal) requires QSLs. All types welcome especially rare DX, pictorial cards and special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose VIC 3765, Tel (03) 9728 5350.

• DO YOU HAVE ANY used telephone cards or stamps lying around? If so could you please send them to the Epilepsy Association of South Australia Inc, PO Box 12, Woodville SA 5011.

AR

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\*See Review in July '93 Amateur Radio\*

## VK QSL BUREAUX

The official list of VK QSL Bureaux. All are Inwards and Outwards unless otherwise stated.

VK1	GPO Box 600 CANBERRA ACT 2601
VK2	PO Box 73 TERALBA NSW 2284
VK3	Box 757G, GPO MELBOURNE VIC 3001
	40G Victory Blvd ASHBURTON VIC 3147
VK4	GPO Box 638 BRISBANE QLD 4001
VK5	PO Box 10092 Gouger St ADELAIDE SA 5001
VK6	GPO Box F319 PERTH WA 6001
VK7	GPO Box 371D HOBART TAS 7001
VK8	C/o H G Andersson VK8HA
	Box 619 HUMPTY DOO NT 0836
VK9/VK0	C/o Neil Penfold VK6NE
	2 Moss Court KINGSLEY WA 6026

# Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details: eg Name, Address, Telephone Number (and STD code), on both form. Please print copy for your Hamad as clearly as possible.

\* Eight lines per issue free to all WIA members, ninth line for name and address. Commercial rates apply for non-members. Please enclose a mailing label from this magazine with your Hamad.

\* Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.

\* Copy typed or in block letters to PO Box 2175,

Caulfield Junction, Vic 3161, by the deadlines as indicated on page 1 of each issue.

\* OTHR means address is correct as set out in the WIA current Call Book.

\* WIA policy recommends that Hamads include the serial number of all equipment offered for sale.

\* Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.

Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows: \$25.00 for four lines, plus \$2.25 per line (or part thereof) Minimum charge - \$25.00 pre-payable.

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☐ Miscellaneous

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# WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division	Address	Officers		Weekly News Broadcasts		1996 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601	President Secretary Treasurer	Philip Rayner John Woolner Bernie Kobier	VK1PJ VK1ZAO VK1KIP	3.570 MHz LSB, 146.950 MHz FM each Sunday evening commencing at 8.00 pm local time. The broadcast text is available on packet, on Internet <a href="http://www.radio.amateur.misc">www.radio.amateur.misc</a> newsgroup, and on the VK1 Home Page <a href="http://email.nla.gov.au/~cmakin/wlaact.html">http://email.nla.gov.au/~cmakin/wlaact.html</a>	(F) \$70.00 (G) (S) \$56.00 (X) \$42.00
VK2	NSW Division 109 Wigram St Parramatta NSW (PO Box 1066 Parramatta 2124 Phone (02) 9689 2417 Freecall 1800 817 644 Fax (02) 9633 1525	President Secretary Treasurer (Office hours	Michael Corbin Eric Fossey Eric Van De Weyer Mon-Fri 11.00-14.00 Sat 1000-1300 Mon 1900-2100)	VK2YC VK2EYF VK2KUR	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 29.120, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (* morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2 m, 70 cm, 23 cm. The broadcast text is available on the Internet newsgroup <a href="http://www.radio.amateur.misc">www.radio.amateur.misc</a> , and on packet radio.	(F) \$66.75 (G) (S) \$53.40 (X) \$38.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 9885 9261 Fax (03) 9885 9298	President Secretary Treasurer (Office hours	Jim Linton Barry Wilton Rob Hailey Tue & Thur 0830-1530)	VK3PC VK3XV VK3NC	VK3BWI broadcasts on the 1st and 3rd Sunday of the month, starts 10.30 am. Primary frequencies 1.840 AM, 3.615 LSB, 7.085 LSB, and FM(R)s 146.700 Mt Dandenong, 147.250 Mt Macedon, 147.225 Mt Baw Baw, and 2 m FM(R)s VK3RMA, VK3RSH and VK3ROW. 70 cm FM(R)s VK3ROU and VK3RGL. Major news under call VK3WV on Victorian packet BBS.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 96 4714	President Secretary Treasurer	Geoff Sanders John Stevens John Presotto	VK4KEL VK4AFS VK4WX	1.825 MHz SSB, 3.605 MHz SSB, 7.118 MHz SSB, 14.342 MHz SSB, 28.400 MHz SSB, 29.220 MHz FM, 52.525 MHz FM, 146.700 MHz FM, 147.000 MHz FM, 438.525 MHz (Brisbane only), regional VHF/UHF repeaters at 0900 hrs Sunday. Repeated on 3.605 MHz SSB & 147.000 MHz FM, regional VHF/UHF repeaters at 1930 hrs EAST Monday. Broadcast news in text form on packet under WIAQ & VKNET.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 8352 3428 Fax (08) 8264 0463	President Secretary Treasurer	Peter Watts Maurie Hooper Charles McEachern	VK5ZFW VK5EA VK5DKD	1827 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.700 FM Mt North, 146.800 FM Midgum, 146.825 FM Barossa Valley, 146.900 FM South East, 146.925 FM Central North, 147.825 FM Gawler, 438.425 FM Barossa Valley, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide, (NT) 3.555 USB, 7.065 USB, 10.125 USB, 146.700 FM, 0900 hrs Sunday, 3.585 MHz and 146.675 MHz FM Adelaide, 1930 hrs Monday.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 351 8673	President Secretary Treasurer	Cliff Bastin Christine Bastin Bruce Hedland-Thomas	VK6LZ VK6ZLZ VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825, 3.560, 7.075, 14.116, 14.175, 21.185, 29.680 FM, 50.150 and 438.525 MHz(X) Country relays 3.582, 147.350(R) Busseton and 146.900(R) Mt William (Burbury). Broadcast repeated on 146.700 at 1900 hrs Sunday, relayed on 1.865, 3.563 and 438.525 MHz; country relays on 146.350 and 146.900 MHz.	(F) \$60.75 (G) (S) \$46.80 (X) \$32.75
VK7	Tasmanian Division 5 Helm Street Newstead TAS 7250 Phone (03) 634 42324	President Secretary Treasurer	Andrew Dixon Robin Harwood Terry Ives	VK7GL VK7RH VK7ZTI	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.725 (VK7RNE), 146.625 (VK7RMD), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs.	(F) \$72.00 (G) (S) \$58.00 (X) \$44.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).			<b>Membership Grades</b> Full (F) Pension (G) Needy (G) Student (S) Non receipt of AR (X)		Three-year membership available to (F) (G) (X) grades at fee x 3 times
Note: All times are local. All frequencies MHz.						

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### TRADE PRACTICES ACT

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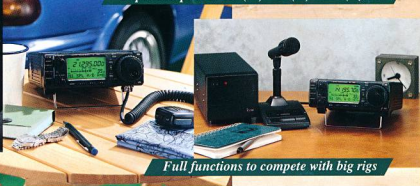
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